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BIBLIOGRAPHY

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TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. ORGANIZATION OF THE BIBLIOGRAPHY.....	2
3. ALPHABETICAL LISTING OF BIBLIOGRAPHIC CITATIONS.....	3
APPENDIX I. SUBJECT LISTING - AUTHOR AND TITLE.....	86
I.1. BEHAVIOR.....	86
I.2. DISPERSAL MOVEMENTS TERRITORY.....	88
I.3. GENERAL BIOLOGY.....	89
I.4. HUMAN LIVESTOCK INTERACTION.....	92
I.5. POPULATION ECOLOGY.....	99
I.6. PREY RELATIONSHIPS.....	101
APPENDIX II. KEY WORD GLOSSARY.....	109
INDEX.....	114

1. INTRODUCTION

In 1978, the gray wolf (Canis lupus) was listed as an endangered species throughout the lower 48 States, with the exception of Minnesota where it was listed as threatened. The listing of endangered and threatened species was authorized by the Endangered Species Act of 1973. The Endangered Species Act requires Federal agencies to carry out conservation programs for listed species and to insure that agency actions are not likely to jeopardize the continued existence of listed species or adversely modify or destroy their critical habitat.

Recently, there has been increased interest in the recovery and management of the Northern Rocky Mountain wolf (Canis lupus irremotus) in the Rocky Mountain States of Montana, Idaho, and Wyoming. Natural resource managers and the public require factual scientific information on wolves, their biology, and their relationships with humans, livestock, and prey species. Such information is vital if intelligent, well-informed decisions are to be made regarding their management.

Because time and good library facilities are required to find the scientific literature on wolves, an annotated bibliography has been compiled to facilitate access to this information. This bibliography is not a complete review of the literature. It primarily cites scientific literature and Government reports but also includes a number of articles written for nonprofessionals. This bibliography was accomplished through a postgraduate project under the supervision of the Montana Cooperative Wildlife Research Unit, the University of Montana Wolf Ecology Project, and the Helena Endangered Species Field Office, U.S. Fish and Wildlife Service, Helena, Montana. Ken Wall provided valuable technical assistance in computer applications used in developing this bibliography. The School of Forestry, University of Montana, and a McIntire-Stennis grant also provided support. Primary funding for this bibliography was provided by the U.S. Fish and Wildlife Service.

Cover by Diane Boyd

2. ORGANIZATION OF THE BIBLIOGRAPHY

This annotated bibliography focuses on the following aspects of wolf ecology: prey relationships, livestock depredation, population ecology, dispersal, territoriality, and perceptions and problems associated with humans and wolves living in close proximity. The bibliography is arranged in four parts: a listing of references in alphabetical order by author, references listed according to subject, a glossary, and an index.

The main body of the bibliography consists of the listing of references arranged by author. Following each author and other bibliographical information is an abstract followed by a list of key words. The key words are listed in the index and defined in the glossary (Appendix I). The key words serve a dual role. Besides their use in the index, they indicate which subjects are discussed within a given reference.

Appendix II contains a subject listing in which references are listed under six subject headings. This section is intended for quick reference by general topic. In this section, a reference is listed by author, year, and title under only one general topic heading.

3. ALPHABETICAL LISTING OF BIBLIOGRAPHIC CITATIONS

Aiton, J.F. 1938. Relationship of predators to white-tailed deer in Glacier National Park. Trans. North Am. Wildl. Conf. 3:302-304.

Examined 240 dead white-tailed deer in 3 winters in western Glacier National Park. Found 61 killed by coyotes, 2 by cougars, 1 by wolves, and 1 by dogs. Conclude malnutrition main mortality factor. Estimate 1,700-1,800 white-tails.

KEY WORDS: Odocoileus virginianus, predation, Montana

Allen, D.L. 1972. Wolves of Minong. Houghton-Mifflin Co., Boston. 499pp.

Account of Isle Royale research. Moose and wolf population dynamics.

KEY WORDS: Isle Royale, Alces alces, predation, general, human attitudes, population ecology, nonprey interactions, prey selection, general interest, range expansion

Allen, D.L. 1978. Wolf-moose studies demonstrate scientific value of wilderness. Trans. Ill. State Acad. Sci. 71(4):436-438.

Short account of wolf-moose population ecology from 1949-1978 on Isle Royale.

KEY WORDS: prey selection, Isle Royale, history, Alces alces, predation

Allen, D.L. 1979. How wolves kill. Nat. Hist. 88(5):46-51.

Thorough nontechnical description of hunting and killing techniques on moose.

KEY WORDS: hunting techniques, predation, prey selection, Alces alces, general interest

Anonymous. 1977. Timber wolf reclassification debated. Endangered Species Tech. Bull. 2(3):1-4.

Summary of Eastern Timber Wolf Recovery Team's 1977 proposal to change status from endangered to threatened.

KEY WORDS: Endangered Species Act and legislation, management, Minnesota

Anonymous. 1982. Return of the wolf. Defenders 57(5):38-39.

General interest article describing current status of the wolf in the Rockies.

KEY WORDS: Montana, distribution, human attitudes, Idaho, general interest

Anonymous. 1984. Current management of ungulates and their predators in the Yukon Territory. Yukon Dept. Renew. Resour. Whitehorse. 31pp.

Moose and caribou declining due to predation and hunting. Clear that large, stable ungulate populations cannot be maintained without predator control. If uncontrolled, predator hunting will have to be intensively managed to follow swings in ungulate numbers.

KEY WORDS: predation, management, Canada, Quebec, Yukon

Anonymous. 1985. Answers to questions frequently asked about Alaska's wolf predation control programs. Alaska Dept. Fish and Game. 4pp.

See title.

KEY WORDS: general interest, management, Alaska, predation

Anonymous. 1986. Wolf hybrids--toward an objective look. Wolf! Supplement. 42pp.

Defines wolf-hybrid, discusses laws dealing with, ethical considerations. Reviews literature on.

KEY WORDS: genetics, dog

Asa, C.S., L.D. Mech, and U.S. Seal. 1985. The use of urine, feces, and anal-gland secretions in scent-marking by a captive pack. Anim. Behav. 33(3):1034-1036.

Only alpha male and female marked with urine. Findings suggested that feces are also used for scent-marking.

KEY WORDS: communication

Atkinson, K. 1985. Effect of wolf control on black-tailed deer in the Nimpkish Valley on Vancouver Island. Ministry of Envir., Fish, and Wildl., Vancouver Island Region. Wildl. Working Rep. No. WR-11. 22pp.

Do not cite; preliminary results. Provides deer numbers in area where wolves were controlled compared to uncontrolled area. Results to date indicate positive response of deer numbers to reduced wolf predation.

KEY WORDS: censusing, British Columbia, Odocoileus hemionus, predation, management, prey response

Atwell, G. 1964. An aerial census of wolves in the Nelchina wolf study area. Pages 79-83 in Proc. 14th Alaskan Sci. Conf. Anchorage, August 27-30, 1963.

Description of aerial census.

KEY WORDS: censusing

Bailey, V. 1907. Wolves in relation to stock, game, and the national forest reserves. U.S. Dept. Agric., For. Serv. Bull. 72. Washington, D.C. 31pp.

Guide to finding and killing wolves: "to be issued to as many ranchers, hunters, trappers, and forest rangers as possible."

KEY WORDS: human interaction, management, human attitudes, distribution, history, depredation, denning, capture, general interest

Ballantyne, E.E. and J.G. O'Donoghue. 1954. Rabies control in Alberta. J. Am. Vet. Med. Assoc. 125(931):316-326.

Account of 1952-54 rabies outbreak. Describes methods of snaring and baiting wolves and their responses to poison. Includes kill computation equations.

KEY WORDS: parasites and disease, capture, management

Ballard, W.B. 1980. Brown bear kills gray wolf. Can. Field-Nat. 94(1):91.

Brown bear in Alaska killed wolf near carcass of a moose.

KEY WORDS: Ursus arctos, nonprey interactions, Alaska, competition

Ballard, W.B. 1982. Gray wolf-brown bear relationships in the Nelchina Basin of south-central Alaska. Pages 71-80 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Bears contested 17 out of 130 kills. Higher percentage contested in low prey density areas. Significance unclear in terms of predation rates of the 2 species.

KEY WORDS: Ursus arctos, nonprey interactions, competition, consumption, predation, Alaska

Ballard, W.B. and J.R. Dau. 1983. Characteristics of gray wolf, Canis lupus, den and rendezvous sites in southcentral Alaska. Can. Field-Nat. 97(3):299-302.

Characterized 18 den sites and 6 rendezvous sites. Mean of 4.5 holes/site. Number of holes not correlated to wolf numbers. Knolls and hillsides with sandy soil and south and/or east exposures most prevalent. Mean distance to water 257 m.

KEY WORDS: denning, rendezvous site

Ballard, W.B., R. Farnell, and R.O. Stephenson. 1983. Long distance movement by gray wolves, Canis lupus. Can. Field-Nat. 97(3):333.

Found 2 and probably 4 wolves from the same pack had moved 732 km between April 1978 and January 1979. Move was possibly due to low prey availability in original area.

KEY WORDS: dispersal

Ballard, W.B., C.L. Gardner, and S.D. Miller. 1980. Influence of predators on summer movements of moose in southcentral Alaska. North Am. Moose Conf. Workshop 16:338-359.

Studied effects of Ursus arctos on movements of cow-calf moose pairs. Found larger home ranges and linear movements in areas with high bear densities.

KEY WORDS: Alces alces, Alaska, predation, prey response, Ursus arctos

Ballard, W.B. and T. Spraker. 1979. Unit 13 wolf studies. Big game investigations. Alaska Dept. Fish and Game, Juneau. Projs. W-17-9, W-17-10, Jobs 14.8R, 14.9R, 14.10R, Vol. II. 90pp.

Alaska. Studied 10 packs. Territories averaged 398 sq mi. Average dispersal 42 mi, some joined established packs. Experimental wolf removal did not increase calf moose survival. Adult moose most common prey item.

KEY WORDS: capture, predation, territory, prey selection, management, competition, Alces alces, Ursus arctos, Rangifer tarandus, activity patterns, Alaska, dispersal

Ballard, W.B. and R.O. Stephenson. 1982. Wolf control--take some and leave some. Alces 18:276-230.

Alaska. Wolves controlled 1976-1978. Repopulation of area occurred annually by immigration and reproduction. Speculate that control would be most effective if 2-3 adult members of each pack were radiocollared and not removed.

KEY WORDS: Alaska, dispersal, management

Ballard, W.B., R.O. Stephenson, and T.H. Spraker. 1981. Nelchina Basin wolf studies. Alaska Dept. Fish and Game, Juneau. Projs. W-17-8, W-17-9, W-17-10, W-17-11, Jobs 14.8R, 14.9R, 14.10R, Final Rep. 200pp.

Alaska. Study from 1975-80. Average age of dispersal 36 months, 68% were male, average distance 68 mi. No statistical difference in calf/cow ratios, moose observed/hr of survey, or ratios of harvested moose between area where wolves were controlled and where they were not.

KEY WORDS: denning, territory, Alces alces, competition, Ursus arctos, predation, Rangifer tarandus, dispersal, population ecology, prey selection, Alaska, nonprey interactions

Ballard, W.B., J.S. Whitman, and C.L. Gardner. 1987. Ecology of an exploited wolf population in south-central Alaska. Wildl. Monogr. 98. 54pp.

Intraspecific strife and other natural factors accounted for 20% of annual mortality; remaining mortalities resulted from legal and illegal harvests. Wolf predation rates in summer ranged from 1 kill/7-16 days/pack, whereas winter rates ranged from 1 kill/5-11 days/pack.

KEY WORDS: breeding strategy, consumption, dispersal, general, management, population ecology, prey response, prey selection, territory, Alces alces

Banfield, A.W. 1958. The mammals of Banff National Park, Alberta. Natl. Museum Canada Bull. No 159. 53pp.

Historical account of wolf populations in Banff.

KEY WORDS: distribution, Canada, Alberta

Banville, D. 1983. Status and management of wolves in Quebec. Pages 41-43 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Classified as furbearing animal, control restricted to deer wintering areas. Stable population.

KEY WORDS: management, Canada, Quebec, history, population ecology

Bath, A.J. 1987. Attitudes of various interest groups in Wyoming toward wolf reintroduction in Yellowstone National Park. M.S. Thesis. Univ. Wyoming, Laramie. 123pp.

Mail-out survey to Wyoming members of Defenders of Wildlife, Wyoming Wildlife Federation, and Wyoming Stock Growers Association. Majority of first two groups supported reintroduction. Stockgrowers opposed.

KEY WORDS: human attitudes, relocation, Yellowstone

Bath, A.J. 1987. Countywide survey of the general public in Wyoming in counties around the park towards wolf reintroduction in Yellowstone National Park. U.S. Natl. Park Serv. Rep. 95pp.

Survey found 51.7% of respondents opposed reintroduction. Respondents who were against reintroduction had a negative attitude towards the wolf and poor knowledge of the animal.

KEY WORDS: human attitudes, relocation, Yellowstone

Bath, A.J. 1987. Statewide survey of the Wyoming general public attitude towards wolf reintroduction in Yellowstone National Park. U.S. Natl. Park Serv. Rep. 93pp.

Survey found 48.5% favored reintroduction; 34.5% were opposed.

KEY WORDS: human attitudes, relocation, Yellowstone

Bekoff, M. 1974. Social play in coyotes, wolves, and dogs. BioScience 24(4):225-229

Compares and contrasts play behavior. Coyotes least playful, dogs (especially pack type such as hounds) are most playful. Suggests early play important in establishing cooperative hunting later.

KEY WORDS: behavior, agonistic behavior, dog, Canis latrans

Bekoff, M. 1977. Mammalian dispersal and the ontogeny of individual behavioral phenotypes. *Am. Nat.* 3(980):715-731.

Studies indicate that social experiential history of individual animals may be a predictor of: 1) differences in social organization between species, and 2) which individuals will disperse first. Further data suggests that aggression does not necessarily lead to dispersal.

KEY WORDS: behavior, dispersal, agonistic behavior

Berg, W.E. and D.W. Kuehn. 1982. Ecology of wolves in north-central Minnesota. Pages 4-11 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Pack territories varied from 143-310 sq km. Packs occupy "islands" of wild land in peripheral range, but abut each other in primary range. Wolves dispersed an average of 148 km, usually to areas of lower wolf density.

KEY WORDS: dispersal, population ecology, censusing, Minnesota, territory

Bergerud, A.T. 1983. The natural population control of caribou. Pages 14-61 in F.L. Bunnell, D.S. Eastman, and J.M. Peek, eds. *Symp. Nat. Regulation Wildl. Populations*, Mar. 10, 1978. For., Wildl., and Range Exp. Stn., Univ. Idaho, Moscow.

Caribou population regulation is hypothesized to be by starvation in tundra; by meningeal worm infestation in Lake States-Arcadian forests; and by predation (especially wolves) in boreal and subalpine forests.

KEY WORDS: Rangifer tarandus, predation, prey response

Bergerud, A.T. 1985. Antipredator strategies of caribou: dispersion along shorelines. *Can. J. Zool.* 63(6):1324-1329.

Small herd (15-20) caribou inhabit shoreline along Lake Superior. Lake provides means of escape, islands provide safe calving areas. This is consistent with hypothesis that caribou cannot exist in areas where high wolf numbers are maintained by moose without special features.

KEY WORDS: Rangifer tarandus, Canada, Ontario, Alces alces, Lynx canadensis, small prey, predation, prey response

Bergerud, A.T. and W.B. Ballard. 1988. Wolf predation on caribou: the Nelchina herd case history, a different interpretation. *J. Wildl. Mgmt.* 52(2):344-357.

Rebuts Van Ballenberghe's 1985 case history of herd. Concludes that predation of young animals was most consistent natural limiting factor in dynamics of the herd from 1950 to 1984.

KEY WORDS: predation, prey biomass, prey response, Rangifer tarandus, Alaska

Bergerud, A.T., W. Wyett, and B. Snider. 1983. The role of wolf predation in limiting a moose population. *J. Wildl. Manage.* 47(4):977-988.

Canada. Wolf predation limited moose population increase. Model presented to explain differences in moose density based on escape habitats, escape tactics of moose, and requisite space to increase predator search time.

KEY WORDS: Alces alces, Canada, modeling, prey response

Biarvall, A. and E. Nilsson. 1976. Surplus-killing of reindeer by wolves. *J. Mammal.* 57(3):585.

Sweden. Found 2 wolves killed 40 semi-domesticated reindeer in 2 weeks. No selection for age, sex, or condition. Hypothesize that heavy snowfall increased vulnerability.

KEY WORDS: Europe, depredation, reindeer, prey selection, surplus killing

Bibikov, D.I. 1980. Wolves in the U.S.S.R. *Nat. Hist.* 89(6):58-63.

Discusses status. Rigorous control programs in effect. Wolves that are often disturbed by humans show decreased pack activity, and greater mobility. Non-technical.

KEY WORDS: Union of Soviet Socialist Republics, management, human attitudes, human interaction, distribution, general, general interest

Bibikov, D.I. 1982. Wolf ecology and management in the U.S.S.R. Pages 120-133 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Describes "wolf corrals," areas where wolves have killed much prey over a period of years. Describes results of predator-prey studies, management strategies.

KEY WORDS: population ecology, predation, Union of Soviet Socialist Republics, prey response, prey selection, hunting techniques, human interaction, genetics, single wolves, management

Bibikov, D.I., A.N. Filimonov, and A.N. Kudaktin. 1983. Territoriality and migration of the wolf in the U.S.S.R. *Acta Zool. Fenn.* 174:267-268.

Territory size of 30-1000 sq km determined by habitat type. Range usually increases in winter except in mountains.

KEY WORDS: territory, dispersal, Union of Soviet Socialist Republics

Bibikov, D.I., N.G. Ovsyannikov, and A.N. Filimonov. 1983. The status and management of the wolf population in the U.S.S.R. *Acta Zool. Fenn.* 174:269-271.

Wolf numbers increased in 1970's due to reduced hunting pressure and abundant food. Energetic control measures now in effect.

KEY WORDS: management, Union of Soviet Socialist Republics

Bjarvall, A. 1983. Scandinavia's response to a natural repopulation of wolves. *Acta Zool. Fenn.* 174:273-275.

Man is primary mortality factor. Long-term survival appears unlikely.

KEY WORDS: management, Europe, human attitudes

Bjarvall, A. and E. Isakson. 1982. Winter ecology of a pack of three wolves in northern Sweden. Pages 146-157 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Utilized range of 600 sq km. Moose utilized more heavily than reindeer toward end of winter. Possibly snow hindered moose but wolves could stay on top.

KEY WORDS: tracking, Europe, predation, prey selection

Bjorge, R.R. 1980. Management and research of the wolf-livestock conflict in Alberta. Pages 72-76 in *Proc. Can. Pest Manage. Soc.*, Edmonton, Alberta.

Wolf predation not a serious negative factor to livestock industry in Peace River area. Recommends better informing of cattle owners on how to avoid problems and potential for problems on various leases. Recommends use of snaring and trapping instead of poisons.

KEY WORDS: cattle, depredation, Alberta, management

Bjorge, R.R. 1983. Mortality of cattle on two types of grazing areas in northwestern Alberta. *J. Range Manage.* 36(1):20-21.

Cattle mortality investigated on 3 intensively managed areas and 7 heavily treed, less intensively managed areas. Cattle losses in less intensively managed areas were 2.7 times greater than on managed area. Livestock owners should be made aware of higher risks in these areas and pregnant cows should not be placed on remote woodland areas.

KEY WORDS: cattle, depredation, Alberta

Bjorge, R.R. and J.R. Gunson. 1983. Wolf predation on cattle on the Simonette River pastures in west-central Alberta. Pages 106-111 in L.N. Carbyn, ed. *Wolves in Canada and Alaska*. Can. Wildl. Serv. Rep. Ser. 45.

Wolves killed 16 out of 1,558 cattle. After winter control efforts, wolves killed 3 out of 1,772. Winter wolf control may not be effective in removing offending lone and paired wolves as they may move away from livestock areas in winter.

KEY WORDS: depredation, cattle, management, Canada, Alberta, single wolves

Bjorge, R.R. and J.R. Gunson. 1985. Evaluation of wolf control to reduce cattle depredation in Alberta. *J. Range Manage.* 38(6):483-487.

Strychnine used--reasonably selective. Wolves declined from 40 to 3. Ingress of wolves occurred within 1-2 years. Cattle loss dropped from 3.4-2%. Suggests more emphasis be placed on preventive management.

KEY WORDS: depredation, cattle, management, Alberta

Boitani, L. 1982. Wolf management in intensively used areas of Italy. Pages 158-172 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Garbage 60-70% of diet. Management plan described. Most mortality human caused. Usually 2 or 3 in a pack.

KEY WORDS: management, Europe, depredation, predation, dispersal, human interaction, activity patterns, population ecology

Boitani, L. 1983. Wolf and dog competition in Italy. *Acta Zool. Fenn.* 174:259-264.

Found 1 wolf/100 sq km, 174-392 free ranging or feral dogs/100 sq km. Dogs compete for food, "genetic" competition. Wolves often blamed for damage done by dogs.

KEY WORDS: competition, dog, Europe, genetics, management, human interaction, human attitudes

Boitani, L. and E. Zimen. 1979. The role of public opinion in wolf management. Pages 471-477 in E. Klinghammer, ed. *The behavior and ecology of wolves*. Garland STPM Press, NY.

Stresses importance of public relations campaigns in wolf preservation. Italy's is organized into 3 linked channels: 1) national--utilizing mass media; 2) frequent local, regional, and national drives; 3) close contact with local people.

KEY WORDS: human attitudes, Europe

Boyd, D. 1982. Food habits and spatial relations of coyotes and a lone wolf in the Rocky Mountains. M.S. Thesis. Univ. Mont., Missoula. 109pp.

Wolf depended primarily on ungulates year around. Winter tracking indicated scent markings, etc., were investigated interspecifically. They used same area spatially but not temporally.

KEY WORDS: Canis latrans, predation, human interaction, nonprey interactions, single wolves, range expansion, communication

Brittan, M.R. 1953. A note concerning wolves in Glacier National Park, Montana. *J. Mammal.* 34(1):127-129.

Historical account of wolf distribution in Glacier National Park.

KEY WORDS: distribution, history, Montana

Brown, D.E., ed. 1983. The wolf in the southwest, the making of an endangered species. Univ. Arizona Press, Tucson. 195pp.

Primarily a historical account of the extirpation of the gray wolf from the American Southwest.

KEY WORDS: Endangered Species Act and legislation, history, general, general interest

Bulger, A.J. 1975. The evolution of altruistic behavior in social carnivores. *Biologist* 57(2):41-51.

Recruitment rates are shown to be important in determining size of social unit and constancy of membership, both of which permit evolution of communal care of young through kin selection.

KEY WORDS: behavior, social system, population ecology, genetics

Burkholder, B. 1959. Movements and behavior of a wolf pack in Alaska. *J. Wildl. Manage.* 23(1):1-11.

Pack of 10 wolves moved in clockwise direction in 5000-sq-mi area. Average daily distance was 15.5 mi. Killed prey every 1.7 days. No selectivity for sex or age of prey noted.

KEY WORDS: predation, prey selection, Alaska, territory, activity patterns, hunting techniques, behavior, human interaction

Burns, R.J. 1983. Microencapsulated lithium chloride bait aversion did not stop coyote predation on sheep. *J. Wildl. Manage.* 47(4):1010-1017.

Experiments conducted with LiCl to find a concentration that produces optimum sheep-bait aversion, and to test the transfer of bait aversion to sheep-killing aversion in sheep-killing and naive coyotes. Seemed ineffective in both.

KEY WORDS: depredation, sheep

Buskirk, S.W. and P.S. Gipson. 1978. Characteristics of wolf attacks on moose in Mount McKinley National Park, Alaska. *Arctic*. 31(4):499-502.

Wolves attacked hind legs and nose. Grizzlies bit dorsal neck and back.

KEY WORDS: kill analysis, Alces alces, hunting techniques

Carbyn, L.N. 1974. Wolf population fluctuations in Jasper National Park, Alberta, Canada. *Biol. Conserv.* 6(2):94-101.

Population fluctuations mainly a result of human pressures in areas adjacent to park. Population negatively affected by disturbance at den site and high percentage of ungulates on heavily traveled roads as wolves tend to avoid traveled roads.

KEY WORDS: human attitudes, human interaction, population ecology, management, population regulation, Canada, Alberta

Carbyn, L.N. 1974. Wolf predation and behavioral interactions with elk and other ungulates in an area of high prey diversity. Ph.D. Thesis. Univ. Toronto, Toronto. 233pp.

Study included tracking, intense observation at den and rendezvous sites, and recording elk behavior. Speculations drawn about anti-predator behavior. Reason for low wolf density in area is hypothesized.

KEY WORDS: human interaction, predation, Cervus elaphus, Odocoileus hemionus, Alces alces, Ovis canadensis, Rangifer tarandus, prey response, prey selection, denning, rendezvous site, hunting techniques, territory

Carbyn, L.N. 1975. Factors influencing activity patterns of ungulates at mineral licks. *Can. J. Zool.* 53(4):378-384.

Canada. Wolves common in area but no evidence that predation pressures influenced the activity patterns of the ungulates.

KEY WORDS: prey response, Cervus elaphus, Odocoileus hemionus, Canada

Carbyn, L.N. 1977. Preliminary analysis of wolf-ungulate interactions with specific reference to moose in Riding Mountain National Park, Manitoba. *North Am. Moose Conf. Workshop* 13:283-289.

Results of 2 years of research. Wolves declined from 1/23 sq km to 1/46 sq km. Elk main prey. Moose accounted for 4% of food items in scats.

KEY WORDS: predation, territory, censusing, scat analysis, population ecology, Alces alces, Canada, Manitoba, Cervus elaphus

Carbyn, L.N. 1979. Species-oriented matrix studies to investigate ecosystems in a Canadian National Park. Pages 409-414 in R.M. Linn, ed. *Proc. 1st Conf. Sci. Resear. Natl. Parks*, Vol. 1, New Orleans.

Technique begins with asking "What does it take to have a carnivore population and how can we keep it there?"

KEY WORDS: predation, management

Carbyn, L.N. 1979. Wolf howling as a technique to ecosystem interpretation in national parks. Pages 458-470 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Public wolf howling programs developed in 1963. Integrated into national parks in 1972. From 1972-74 there were 13 trips attended by 1,125 people. Response by wolves was 25%.

KEY WORDS: communication, human attitudes, Canada, human interaction

Carbyn, L.N. 1979. A wolf manifesto for the world. Ontario Naturalist 18(5):18-22.

Carbyn remembers Pimlott and his efforts to change attitudes toward the wolf as well as the management of wolves.

KEY WORDS: human attitudes, Canada, general interest

Carbyn, L.N. 1980. Ecology and management of wolves in Riding Mountain National Park, Manitoba. Can. Wildl. Serv. Fin. Rep. Large Mammal Sys. Studies. Rep. No. 10. 184pp.

Study from 1975-79. Overall shift in territory configuration was 31%. Density varied from 1/25 sq km to 1/57 sq km, 3 to 6 members/pack. Winter mortality high. Elk main prey.

KEY WORDS: Canada, Manitoba, predation, territory, population ecology, depredation, prey selection, nonprey interactions, communication, Cervus elaphus, Castor canadensis, management, Canis latrans

Carbyn, L.N. 1980. Incidence of disease and its potential role in the population dynamics of wolves in Riding Mountain National Park, Manitoba. Can. Wildl. Serv. Paper presented at the Portland, Oregon, Wolf Symp. Aug. 13-17, 1979. 20pp.

Disease-caused decline in wolf population not limited by food. Disease affects wolves through loss of experienced adults and through reduction in pack size which affects prey selection.

KEY WORDS: parasites and disease, population regulation, territory, population ecology, prey selection, Canada

Carbyn, L.N. 1981. Territory displacement in a wolf population with abundant prey. J. Mammal. 62(1):193-195.

Canada. Pack of 16 wolves relinquished part of their territory to a pack of 10; no reason for shift noted. The 16-wolf pack added agricultural land to its territory. No depredation noted.

KEY WORDS: agonistic behavior, territory, Canada

Carbyn, L.N. 1982. Coyote population fluctuations and spatial distribution in relation to wolf territories in Riding Mountain National Park, Manitoba. *Can. Field-Nat.* 96(2):176-183.

As wolves declined coyotes increased. Examined 7 wolf-killed coyotes. Coyotes not consumed. Coyote survival greatest along wolf territory edges.

KEY WORDS: competition, nonprey interactions, Canis latrans, Canada

Carbyn, L.N. 1982. Incidence of disease and its potential role in the population dynamics of wolves in Riding Mountain National Park, Manitoba. Pages 106-116 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ. Park Ridge, NJ.

Documents decline of wolf population that was not food-limited. Disease affects packs through loss of experienced adults and reduced recruitment. Smaller packs may alter prey selection. Loss of adults may cause territory instability.

KEY WORDS: parasites and disease, population regulation, Canada, Manitoba, single wolves, population ecology, territory, prey selection

Carbyn, L.N. 1983. Management of non-endangered wolf populations in Canada. *Acta. Zool. Fenn.* 174:239-243.

Wolf populations currently not endangered. Questions role of wolf in ungulate declines. Outlines conservation strategies.

KEY WORDS: depredation, management, predation, Canada, history, distribution, human attitudes

Carbyn, L.N. 1983. Wolf predation on elk in Riding Mountain National Park, Manitoba. *J. Wildl. Manage.* 47(4):963-976.

Elk forms main food base. Consumed 0.21kg prey/kg wolf/day. Distance between kills 5.1 km. No clear pattern of elk distribution within wolf territories. Killed larger proportion of old and young. Prey in good condition as judged by femur fat.

KEY WORDS: predation, Cervus elaphus, Alces alces, Odocoileus virginianus, activity patterns, prey selection, surplus killing, prey response, Canada, Manitoba, consumption

Carbyn, L.N. 1984. Status of wolves in the Canadian plains region. *Prairie Forum*. 9(2):291-298.

Wolf range decreased in 19th century with extirpation of bison. Recent range extensions documented. Areas of conflict with humans (including game ranching) delineated.

KEY WORDS: history, management, human attitudes, depredation, cattle, Canada, range expansion

Carbyn L.N. ed. 1983. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45. 135pp.

Assortment of papers dealing with status, management, depredation, public wolf howls, track identification.

KEY WORDS: general

Carbyn, L.N. and M.C.S. Kingsley. 1979. Summer food habits of wolves with the emphasis on moose in Riding Mountain National Park. Proc. North Am. Moose Conf. Workshop 15:349-361.

Scat analyses show moose are relatively rare prey items, including calves. This is probably due to the availability of less well defended species such as elk, beaver, and deer.

KEY WORDS: scat analysis, predation, Alces alces, Canada, Manitoba, hair analysis, prey selection, Cervus elaphus, Odocoileus virginianus, Castor canadensis, small prey

Carbyn, L.N. and T. Trottier. 1987. Responses of bison on their calving grounds to predation by wolves in Wood Buffalo National Park. Can. J. Zool. 65:2072-2078.

Wolves, especially those in packs, preferentially attacked bison herds with calves over herds without calves. Single wolves more likely to attack herds of bulls only than wolves in packs.

KEY WORDS: Bison bison, hunting techniques, predation, prey response, prey selection, Alberta, single wolves

Carbyn, L.N., T. Trottier, and S. Oosenbrug. 1981. Summer (1980) observations of wolf-bison behavioral interactions in Wood Buffalo National Park. Can. Wildl. Serv. Prog. Rep. No. 4. 71pp.

Results largely descriptive and preliminary. Passive encounters with bison prevail when single wolves are involved. Active encounters prevail with packs. Herds with calves most often approached.

KEY WORDS: prey selection, hunting techniques, Bison bison, Canada, Alberta, predation, prey response, single wolves

Chapman, R.C. 1977. The effects of human disturbance on wolves (Canis lupus). M.S. Thesis. Univ. Alaska, Fairbanks. 209pp.

Wolves characteristically respond to human disturbance near their pups by howling, leaving the area, and/or moving pups. Low intensity disturbance seems unlikely to cause significant pup mortality. A 2.4 km radius should be closed around den sites.

KEY WORDS: human interaction, denning, rendezvous site

Chapman, R.C. 1979. Human disturbance at wolf dens--a management problem. Pages 323-328 in R.M. Linn, ed. Proc. 1st Conf. Sci. Resear. Natl. Parks, New Orleans, 1976. U.S. Natl. Park Serv., Proc. Ser. No. 5., Vol. 1.

Wolves experimentally disturbed at den sites at Denali National Park. Recommends prohibiting access for 2.4 km radius in open country and same for known rendezvous sites. Disturbance before whelping especially critical. Closure 4 weeks prior to whelping to Aug. 1.

KEY WORDS: human interaction, denning, rendezvous site, Alaska

Cheney, C.D. 1982. Probability learning in captive wolves. Pages 272-281 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Preliminary results demonstrate that wolves may not always maximize reinforcement pay-off. Coyotes and foxes in a similar experiment came to maximize quite clearly.

KEY WORDS: behavior

Connolly, G. and R.J. Burns. 1981. Old and new lethal methods for corrective control of coyote depredations. Symp. on Situation Manage.: Aspen and Coyotes. Utah St. Univ., Logan. April 23-24, 1981.

Describes old and new methods of coyote control. Limited data indicate aerial shooting is quite selective for offending coyotes.

KEY WORDS: depredation, management

Connolly, G.E., R.E. Griffiths, and P.J. Savarie. 1978. Toxic collar for control of sheep-killing coyotes: a progress report. Pages 197-205 in Proc. 8th Vertebr. Pest Control Conf., Univ. Calif., Davis.

Diphacinone-filled collars readily accepted by coyotes and were lethal to them. Subsequent incidence of predation generally lower than before the test.

KEY WORDS: depredation, management, sheep

Coppinger, L. and R. Coppinger. 1982. Livestock-guarding dogs that wear sheep's clothing. Smithsonian 13(1):64-73.

Discusses the differences between guard dogs and herding dogs. Guard dogs more puppyish, display conflicting signals when predators approach.

KEY WORDS: depredation, general interest, sheep

Cowan, I.M. 1947. The timber wolf in the Rocky Mountain national parks of Canada. Can. J. Res. 25(d):139-174.

Comparison of elk and deer herds living with and without wolf pressure show no differences in mortality or reproduction.

KEY WORDS: consumption, general, management, prey response, predation, territory, population ecology, Canada, British Columbia, Alberta, Saskatchewan, Alces alces, Cervus elaphus, Odocoileus hemionus, Ovis canadensis

Crete, M. and F. Messier. 1987. Evaluation of indices of gray wolf, Canis lupus, density in hardwood-conifer forests of southwestern Quebec. Can. Field-Nat. 101:147-152.

Density estimates from radiotelemetry were related to 5 indices through regression analysis. The use of wolf howling heard by hunters, percentage of hunters observing scats, and percentage observing tracks is recommended because of lower variance and lower cost of collection as compared with other indices.

KEY WORDS: censusing, Quebec

Dalrymple, B. 1919. The gray wolf of South Dakota. Altoona Tribune Co., Altoona, PA. 31pp.

Description by a wolfer of his job. Many anecdotes on trapping and killing wolves.

KEY WORDS: history, depredation, South Dakota, human attitudes, capture

Day, B.L. 1981. The status and distribution of wolves in the northern Rocky Mountains of the United States. M.S. Thesis. Univ. Mont., Missoula. 130pp.

Status and distribution of wolves in the northern Rocky Mountains and legal and historical considerations were investigated between 1974 and 1977.

KEY WORDS: Endangered Species Act and legislation, distribution, Idaho, Montana, Wyoming, British Columbia, Alberta

Dekker, D. 1985. Responses of wolves, Canis lupus, to simulated howling on a homesite during fall and winter in Jasper National Park, Alberta. Can. Field-Nat. 99(1):90-93.

Wolf pack approached simulated howling from homesite only once. Replied readily. Utilized and returned to homesite during winter possibly because it was in a major ungulate wintering range.

KEY WORDS: communication, human interaction, rendezvous site, Canada, Alberta

Dorfman, A. 1984. Will hunting save the wolf? Sci. Digest 92(5):16.

Controversy over allowing wolf hunting in Minnesota addressed.

KEY WORDS: Endangered Species Act and legislation, Minnesota, management, general interest

Dorrance, M.J. 1982. Predation losses of cattle in Alberta. J. Range Manage. 35(6):690-692.

16% of confirmed losses due to predation were attributed to wolves. Remainder attributed to coyotes (35%), black bears (31%), and unknown (18%). Wolf predation peaked in Aug.-Sept. May be desirable to remove cattle from remote, forested pastures during late summer if wolf predation is a problem.

KEY WORDS: depredation, cattle, Alberta

Eide, S.H. and W.B. Ballard. 1982. Apparent case of surplus killing of caribou by gray wolves. Can. Field-Nat. 96(1):87-88.

Wolves killed 7 apparently healthy caribou and only partially consumed them. Deep snow may have increased vulnerability. Surplus killing may be common under these circumstances.

KEY WORDS: surplus killing, predation, Rangifer tarandus

Elliot, O. and M. Wong. 1972. Acid phosphatase, handy enzyme that separates the dog from the wolf. Acta. Biol. Med. Germ. 28:957-962.

Domesticated canids clearly distinguishable from wolves by starch gel electrophoresis of RBC acid phosphatase.

KEY WORDS: physiology, dog

Fentress, J.C. 1979. Behavior mechanisms and preparing wolves for life in the wild. Pages 307-315 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Round table discussion on merits of captive versus wild wolf reintroduction. Defines future study needs.

KEY WORDS: relocation, behavior, human interaction, agonistic behavior

Fentress, J.C. and J. Ryon. 1982. A long-term study of distributed pup feeding in captive wolves. Pages 238-261 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Adults selectively fed, pups unselectively fed. Individual differences and changes in social structure are reflected in feeding patterns.

KEY WORDS: denning, behavior, social system

Field, R. 1979. A perspective on syntactics of wolf vocalizations. Pages 182-205 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Description and definition of a vocal repertoire are important in studies of vocal communication. A method is discussed and applied in comparisons of squeak-type sounds.

KEY WORDS: communication

Filonov, C. 1980. Predator-prey problems in nature reserves of the European part of the RSFSR. J. Wildl. Manage. 44(2):389-39.

Intensity of predation fluctuated by 5-25 times and natural mortality of prey by 1.5 or 2 times. Stable mortality rate in ungulates maintained by a system of compensating mechanisms.

KEY WORDS: Union of Soviet Socialist Republics, predation, management

Fischer, H. 1986. L. David Mech discusses the wolf. Defenders 61(6):6-15.

Interview with Mech covering a variety of topics. Reintroduction to Yellowstone, management philosophy, future of and place for the wolf in North America.

KEY WORDS: general interest, Yellowstone, management, human attitudes

Floyd, T.J., L.D. Mech, and P.A. Jordan. 1978. Relating wolf scat content to prey consumed. J. Wildl. Manage. 42(3):528-532.

In collectible scats the remains of small prey occurred in greater proportion relative to the prey's weight and in lesser proportion relative to the prey's numbers than large prey. Regression equation given. Useful in converting scat contents to biomass and numbers of prey consumed.

KEY WORDS: consumption, predation, scat analysis

Fox, M.W. 1971. Possible examples of high-order behavior in wolves. J. Mammal. 52(3):640-641.

Identified 2 examples of high-order behavior (showing both insight and purposefulness) in social situations.

KEY WORDS: behavior

Fox, M.W. 1975. The wild canids. Van Nostrand Reinhold Co., NY. 508pp.

Systematics, behavioral ecology, and evolution.

KEY WORDS: general

Fox, M.W. and R.V. Andrews. 1972. Physiological and biochemical correlates of individual differences in behavior of wolf cubs. *Behaviour* 15(6):129-140.

Markedly different response in hormonal and heart rate on reaction to stress between low, middle, and high ranking cubs.

KEY WORDS: behavior, social system, physiology

Fox, J.L. and G.P. Streveler. 1986. Wolf predation on mountain goats in southeastern Alaska. *J. Mammal.* 67(1):192-195.

Goat behavior and habitat use (broken, rocky terrain) may be highly correlated with predation pressure. Found 62% of wolf scats contained goat remains.

KEY WORDS: prey response, Oreamnos americanus, scat analysis, predation, hunting techniques, prey selection, Alaska

Frenzel, L.D. 1974. Occurrence of moose in food of wolves as revealed by scat analyses: a review of North American studies. *Naturalist Can.* 101:467-479.

Reviews North American wolf food habits studies accomplished by scat analysis of wolves associated with moose.

KEY WORDS: Alces alces, predation, scat analysis

Friis, L.K. 1985. An investigation of subspecific relationships of the grey wolf, Canis lupus, in British Columbia. M.S. Thesis. Univ. Victoria, Victoria, B.C. 162pp.

Analysis of skull measurements suggest 2 major groups of wolves in British Columbia. Limited hybridization with dogs appears to be taking place on Vancouver Island.

KEY WORDS: taxonomy, genetics, dog, Canada, British Columbia

Frijlink, J.H. 1977. Patterns of wolf pack movements prior to kills as read from tracks in Algonquin Provincial Park, Ontario. *Bijd. Dierkd.* 47(1):131-137.

Evidence that 2 packs temporarily joined forces. Packs constantly fan out and then come together again. This greatly enhances chance of finding prey. Most kills in open areas.

KEY WORDS: activity patterns, tracking, hunting techniques, Canada, Ontario

Fritts, S.H. 1979. Dynamics, movements, and feeding ecology of a newly protected wolf population in northwestern Minnesota. Ph.D. Thesis. Univ. Minnesota, St. Paul. 219pp.

Low but increasing wolf density. High dispersal rate. White-tailed deer and moose were primary prey, old and young most susceptible. Consumed 2.9 kg meat/day/wolf in winter. Livestock consumption much less than availability. Social and spatial dynamics of an increasing wolf population described.

KEY WORDS: general, depredation, predation, dispersal, territory, prey selection, consumption, cattle, sheep, Minnesota

Fritts, S.H. 1982. Wolf depredation on livestock in Minnesota. U.S. Fish Wildl. Resour. Publ. 145. Washington D.C. 11pp.

Relocation of depredating wolves not effective. Specifies verification procedure and problems associated with it. Cattle and sheep losses were 0.45 and 1.18/1000, respectively. Many of these were missing animals and not verifiable wolf kills. Verified 13 of 122,230 reported kills. Study from 1976-80.

KEY WORDS: depredation, cattle, sheep, relocation, management, Endangered Species Act and legislation, Minnesota

Fritts, S.H. 1983. Record dispersal by a wolf from Minnesota. J. Mammal. 64(1):166-167.

Record dispersal for terrestrial mammal; young male wolf moved 886 km before shot. Demonstrates potential for gene flow between subspecies.

KEY WORDS: Minnesota, dispersal, genetics

Fritts, S.H. and L.D. Mech. 1981. Dynamics, movements, and feeding ecology of a newly protected wolf population in northwestern Minnesota. Wildl. Monogr. 80. 79pp.

Low but increasing wolf density. High dispersal rate. White-tailed deer and moose primary prey, old and young animals most susceptible. Consumed 2.9 kg meat/day/wolf in winter. Livestock consumption much less than available. Social and spatial dynamics of an increasing wolf population described.

KEY WORDS: general, depredation, predation, dispersal, territory, prey selection, consumption, cattle, sheep, Minnesota

Fritts, S.H., W.J. Paul, and L.D. Mech. 1979. Evaluation of methods for alleviating wolf depredations on livestock. U.S. Fish and Wildl. Serv. 21pp.

Suggests that restricted lethal trapping, coupled with alternate methods of minimizing wolf visits to pastures, may constitute the proper formula for alleviating as much as possible the wolf-caused damage to livestock in Minnesota with the least public controversy.

KEY WORDS: depredation, human attitudes, Minnesota

Fritts, S.H., W.J. Paul, and L.D. Mech. 1984. Movements of translocated wolves in Minnesota. *J. Wildl. Manage.* 48(3):709-721.

Translocated 107 wolves near farms reporting depredation. All radiotagged (17) wolves left release site. Adults left first. Wolves released together did not stay together. Unsuccessful in keeping problem wolves out of livestock areas.

KEY WORDS: Minnesota, relocation, management, depredation, cattle, sheep

Fritts, S.H., W.J. Paul, and L.D. Mech. 1985. Can relocated wolves survive? *Wildl. Soc. Bull.* 13(4):459-463.

In Minnesota 107 depredating wolves were released in non-agricultural land inhabited by wolves. Recaptured 13% of these wolves at farms. Survival and behavior appeared comparable to naturally dispersing wolves.

KEY WORDS: relocation, dispersal, Minnesota, capture, cattle, sheep

Fuller, T.K. 1982. Wolves. Pages 225-226 in D.E. Davis, ed. *CRC handbook of census methods for terrestrial vertebrates*. CRC Press, Inc., Boca Raton, FL.

Short discussion of track surveys, modified aerial strip census, and radiotelemetry to locate packs so individuals can be counted.

KEY WORDS: censusing

Fuller, T.K. and L.B. Keith. 1980. Wolf population dynamics and prey relationships in northeastern Alberta. *J. Wildl. Manage.* 44(3):583-602.

Killed more young, old, debilitated moose, also more female calves and adult bulls; most kills in lowland habitat. Deep snow and cold temperatures decreased daily movements. Higher population density near human habitation with refuse dumps.

KEY WORDS: Canada, Alberta, prey selection, population ecology, activity patterns, Alces alces, Castor canadensis, population regulation, human interaction, prey biomass

Fuller, T.K. and L.B. Keith. 1981. Immobilization of wolves in winter with etorphine. *J. Wildl. Manage.* 45(1):271-273.

Use of etorphine hydrochloride described. Good because produced rapid (<5 min) immobilization and could be reversed quickly with diprenorphine (<6 min).

KEY WORDS: capture

Fuller, T.K. and L.B. Keith. 1981. Non-overlapping ranges of coyotes and wolves in northeastern Alberta. *J. Mammal.* 62(2):403-405.

Coyotes appear to have ranges at edges of wolf pack territories, as they may be less vulnerable there.

KEY WORDS: Canada, Alberta, nonprey interactions, Canis latrans, territory, competition

Fuller, T.K. and B.A. Sampson. 1988. Evaluation of a simulated howling survey for wolves. *J. Wildl. Manage.* 52(2):60-63.

Evaluation indicates that the density estimate is imprecise and possibly overestimates abundance. Because of logistical and statistical constraints, the technique is not practical for surveying large (e.g., state or province) areas, but simulated howling is useful for locating packs in smaller areas.

KEY WORDS: censusing, Minnesota

Garceau, P. 1960. Food habits and hunting behavior of wolves in southeastern Alaska. Alaska Dept. Fish and Game, Juneau. Proj. W-6-R-1, Work Plan K, Job No. 3. Vol. I:486-489.

Wolves nearly if not entirely dependent on deer on the islands of southeast Alaska. Appears they choose to travel and hunt along frozen lakes when conditions permit.

KEY WORDS: prey selection, Odocoileus hemionus, predation, hunting techniques, Castor canadensis, small prey, scat analysis, Alaska

Garceau, P. 1960. Wolf management studies. Reproduction, growth and mortality of wolves in southeast Alaska. Alaska Dept. Fish and Game, Juneau. Proj. W-6-R-1, Work Plan K, Job 2. Vol. I:458-485.

Growth of 7 captive wolves recorded during their first year of life.

KEY WORDS: physiology, population ecology

Garceau, P. 1962. Wolf investigations. Wolf predation on Sitka black-tailed deer. Alaska Dept. Fish and Game, Juneau. Proj. W-6-R3, Work Plan K, Job No. 1. 16pp.

Litter born on Coronation Island to wolves released there in 1960. Feeding primarily on harbor seals.

KEY WORDS: predation, Odocoileus hemionus, Alaska, range expansion

Garceau, P. and G. Atwell. 1961. Wolf management studies. Alaska Dept. Fish and Game, Juneau. Proj. W-6-R-2, Work Plan K, Jobs No. 1 and 2. Vol. II, No. 10. 30pp.

Released 4 wolves raised in captivity on Coronation Island, Alaska. At least 2 made successful adjustment. Aerial census in Nelchina Basin described. Captive wolves experimentally drugged.

KEY WORDS: Odocoileus hemionus, Alaska, relocation, capture, population ecology, parasites and disease, censusing, physiology, range expansion

Gasaway, W.C., R.O. Stephenson, J.L. Davis, P.K. Shepard, and O.E. Burris. 1983. Interrelationships of wolves, prey, and man in interior Alaska. Wildl. Monogr. 84. 50pp.

Mortality from severe winters, hunting, and wolf predation were largely additive. Prey/wolf ratios can assist in the initial interpretation of wolf-prey relationships. Low survival of young can be viewed as an indication of food limitations when actually the population is limited by predation.

KEY WORDS: prey biomass, Alces alces, Rangifer tarandus, human interaction, predation, history, population ecology, population regulation, management

Gray, D.R. 1983. Interaction between wolves and muskoxen on Bathurst Island, Northwest Territories, Canada. Acta Zool. Fenn. 174:255-257.

Wolves most successful when muskoxen stampede. Takes more time to kill a muskox than a caribou.

KEY WORDS: Ovibos moschatus, predation, prey response, Canada, Northwest Territories, hunting techniques, prey selection

Green, H.U. 1951. The wolf of the Banff National Park, Alberta. Banff National Park, Banff, Alberta. 64pp.

Feeding ecology, distribution, population ecology. Present were 5 groups of wolves. Wolf appeared beneficial by reducing elk to the advantage of other ungulates.

KEY WORDS: general, Alberta, predation

Gunson, J.R. 1983. Status and management of wolves in Alberta. Pages 25-29 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Currently has fur-bearing status. Residents can kill a wolf on most deeded lands without license year-round. Estimate 5,000 wolves. About 500 harvested annually plus 50-100 by control. Research projects noted.

KEY WORDS: management, depredation, cattle, Canada, Alberta, history, population ecology

Gunson, J.R. 1983. Wolf predation of livestock in western Canada. Pages 102-105 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Study from 1971-81. Depredation occurs most often along forest-agricultural fringe. Cattle most common, selective for calves and yearlings, most frequent in late summer. Management discussed.

KEY WORDS: management, depredation, cattle, Canada

Gunson, J.R. 1983. Wolf-ungulate predation in North America: review of major studies. Alberta Energy Nat. Resour., Fish and Wildl. Div. 31pp.

Preliminary results. Reviews abstracts of major studies. Wolves often selected species easiest to kill. In all cases where wolves have depressed game numbers, other factors were important--weather, human harvest, habitat changes.

KEY WORDS: prey biomass, predation, management, prey selection, prey response

Gunson, J.R. 1984. Review of management and research of wolf-big game predation in Alberta. Alberta Energy Nat. Resour., Fish and Wildl. Div. 24pp.

Preliminary results. Big game populations increased after wolf removal in 1950's. As wolves increased in 1960's so did hunting pressure from increased access. Research suggests wolves remove more big game than hunters in most studied populations.

KEY WORDS: prey biomass, history, Alces alces, predation, management, Canada, Alberta

Gunson, J.R. 1986. Wolves and elk in Alberta's Brazeau country. Bugle Winter 1986/87:29-33.

Discusses the future of elk hunting in Brazeau country and impacts of wolves. Habitat deterioration and human and wolf predation are cause of decline in elk population. Discusses alternatives available.

KEY WORDS: Cervus elaphus, predation, prey response, general interest, Alberta

Gunson, J.R. and R.M. Nowak. 1979. Largest gray wolf skulls found in Alberta. Can. Field-Nat. 93(3):308-309.

Measurements of greatest length and zygomatic width of 5 large skulls of Canis lupus from Alberta reported. Identified 3, all from range of C. l. occidentalis, that are larger than the previous largest specimen, also occidentalis.

KEY WORDS: taxonomy, Alberta, physiology

Gustavson, C.R. 1982. An evaluation of taste aversion control of wolf Canis lupus predation in northern Minnesota. Appl. Anim. Ethology 9(1):63-71.

Study suggests that method is at least partially successful.

KEY WORDS: depredation, Minnesota

Gustavson, C.R., D.J. Kelly, and M. Sweeney. 1976. Prey-lithium aversions. I: coyotes and wolves. Behav. Biol. 17(1):61-72.

Giving 1 or 2 treatments of food laced with lithium chloride inhibited predatory attacks upon the living prey but left appetite for alternative prey unaffected in captive animals. Sheep ranchers' losses to coyotes reduced 30-60% after treatment in field.

KEY WORDS: depredation, sheep

Haber, G.C. 1974. Wolves and the endangered species concept--a different view. Pages 110-119 in Proc. Symp. Endangered and Threatened Species of North Am., June 11-14, 1974, Washington, D.C.

Important to recognize functional characteristics and safeguard these, not just numerical status. On that basis, argues that wolves in Alaska and Canada are endangered because their social systems (packs) are increasingly disrupted, causing potential genetic problems.

KEY WORDS: Endangered Species Act and legislation, management, genetics, social system, human interaction

Haber, G.C. 1977. Socio-ecological dynamics of wolves and prey in a subarctic ecosystem. Ph.D. Thesis. Univ. British Columbia, Vancouver. 786pp.

Field study for 8 years in Denali region focused primarily on 2 adjacent wolf packs in a largely unexploited ecosystem, to obtain information on their social dynamics and interactions with moose, sheep and caribou.

KEY WORDS: predation, Rangifer tarandus, Alces alces, prey biomass, prey response, population ecology, social system, Ovis dalli, prey selection, consumption, modeling, general, Alaska

Haber, G.C. 1980. The balancing act of moose and wolves. Nat. Hist. 89(10):38-51.

Describes multiple equilibria, predator "pit" in nontechnical way. Explains how even slight human exploitation in a population of moose utilized by predators may collapse. Questions wisdom of bull-only hunts.

KEY WORDS: predation, prey response, modeling, Alces alces, Alaska, prey selection, general interest

Hall, R.L. and H.S. Sharp, eds. 1978. Wolf and man: evolution in parallel. Academic Press, NY. 210pp.

Series of essays by Mech, Peters, Harrington, and others comparing social system of wolves to early hominids. Suggests that wolves are a culture-bearing species.

KEY WORDS: human interaction, hunting techniques, social system, communication, behavior

Hansen, H.J. 1986. Wolves of northern Idaho and northeastern Washington. Mont. Coop. Wildl. Res. Unit. U.S. Fish and Wildl. Serv., Missoula, MT. 88pp.

Current population essentially lone wolves. The Northern Rocky Mountain Wolf Recovery Plan promotes wolf recovery by natural recolonization of wolves from western Canada.

KEY WORDS: management, distribution, Idaho, Washington, history, Endangered Species Act and legislation

Harbo, S.J. and F.C. Dean. 1983. Historical and current perspectives on wolf management in Alaska. Pages 51-65 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Detailed account of wolf management in Alaska to the present.

KEY WORDS: management, history, Alaska

Harrington, F.H. 1975. Response parameters of elicited wolf howling. Ph.D. Diss. State Univ. New York, Stony Brook. 412pp.

Study to determine role of howling in territory maintenance. Response rate influenced by 5 factors: 1) presence of pups; 2) presence near fresh kills; 3) alpha animals during breeding season; 4) only alpha males replied when alone; 5) pack size.

KEY WORDS: communication, territory, human interaction, single wolves

Harrington, F.H. 1978. Ravens attracted to wolf howling. Condor 80(2):236-237.

Ravens appear to fly toward howling especially in winter when wolves are killing large animals and carrion may be available.

KEY WORDS: nonprey interactions, Corvus corax

Harrington, F.H. and L.D. Mech. 1978. Howling at two Minnesota wolf pack summer homesites. Can. J. Zool. 56(9):2024-2028.

Howling monitored for 2 packs. Most occurred between dusk and early morning. Howling increased throughout homesite season. Seems involved in coordination of interpack activities but of secondary importance to scent marking.

KEY WORDS: behavior, rendezvous site, communication, Minnesota

Harrington, F.H. and L.D. Mech. 1979. Wolf howling and its role in territory maintenance. *Behaviour* 68(3-4):207-249.

Scent marking and howling important for spacing packs. Scent marking is long-term and site-specific. Howling is immediate and long range. Response to alien howling differs by time of year and social circumstances.

KEY WORDS: communication, territory, agonistic behavior, human interaction, social system, single wolves

Harrington, F.H. and L.D. Mech. 1982. An analysis of howling response parameters useful for wolf pack censusing. *J. Wildl. Manage.* 46(3):686-693.

Two censuses described, saturation and sampling. Biased toward larger packs. Pack size and composition cannot be delineated. Six recommendations made.

KEY WORDS: censusing, communication

Harrington, F.H. and L.D. Mech. 1982. Fall and winter homesite use by wolves in northeastern Minnesota. *Can. Field-Nat.* 96(1):79-84.

Lone wolves separated from pack often return and spend days at most used summer rendezvous sites. Single wolves are much more likely to reply to howling at these sites than when away.

KEY WORDS: rendezvous site, behavior, territory, Minnesota, single wolves

Harrington, F.H. and L.D. Mech. 1982. Patterns of homesite attendance in two Minnesota wolf packs. Pages 81-105 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Pups left unattended more often than expected by chance. Challenges pup-tending hypothesis. Hypothesize that "helpers" stay at den to obtain food from foraging wolves for themselves.

KEY WORDS: denning, behavior, activity patterns

Harrington, F.H. and L.D. Mech. 1983. Wolf pack spacing: howling as a territory-independent spacing mechanism in a territorial population. *Behav. Ecol. Sociobiol.* 12(2):161-168.

Howling is a principal means of spacing in wolf populations. Response is independent of pack location. When they reply to howling, they usually remain in place, whereas they frequently retreat if they do not reply.

KEY WORDS: communication, territory, human interaction

Harrington, F.H., L.D. Mech, and S.H. Fritts. 1983. Pack size and wolf pup survival: their relationship under varying ecological conditions. *Behav. Ecol. Sociobiol.* 13(1):19-26.

In areas of poor food, pack size and litter size (at 7-8 months) are negatively correlated; with good prey base they are positively correlated. Indicates "helpers" may be reluctant to feed pups when food not easily obtainable.

KEY WORDS: Minnesota, behavior, physiology, population regulation, social system, denning

Harrington, F.H. and P.C. Paquet, eds. 1982. *Wolves of the world*. Noyes Publ., Park Ridge, NJ. 474pp.

Comprehensive book with chapters by authorities in different areas. Perspectives on behavior, ecology, and conservation.

KEY WORDS: general

Harrington, F.H., P.C. Paquet, J. Ryon, and J.C. Fentress. 1982. Monogamy in wolves: a review of the evidence. Pages 209-222 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Frequency of multiple litters dependent on prey density, loss of alpha animals and other factors. It should not be considered an anomaly. Suggests more specific, well-defined terms for wolf breeding strategy than monogamy.

KEY WORDS: behavior, population ecology, denning, breeding strategy

Harris, R. 1981. The status of wolves in Livingstone-Porcupine area of southern Alberta. Preliminary Rep. Wolf Ecol. Proj., Univ. Mont., Missoula. Unpubl. 33pp.

Some pack activity likely though population probably is composed mainly of loners. Depredation is a minor problem. Contains list of wolf observations from 1977-81.

KEY WORDS: Alberta, distribution, history, depredation

Harris, R. 1983. Effects of elk migration and cattle distribution on wolf movements in southern Alberta. Final Rep. Wolf Ecol. Proj., Univ. Mont., Missoula. Unpubl. 13pp.

Found stabilization of the wolf population at a low level probably due to human mortality.

KEY WORDS: Alberta, human interaction

Harris, R.B. and R.R. Ream. 1983. A method to aid in discrimination of tracks from wolves and dogs. Pages 120-124 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Dog tracks indistinguishable from wolf on basis of size but method given uses discriminate function analysis to tell apart in most cases.

KEY WORDS: tracking

Haynes, G. 1980. Prey bones and predators: potential ecologic information from analysis of bone sites. Ossa. 7:75-97.

Deer bones are left by wolves at kill sites, den sites, and rendezvous sites. Site types may be identified (within limits) by type and amount of damage to bones.

KEY WORDS: kill analysis, Odocoileus virginianus

Haynes, G. 1982. Utilization and skeletal disturbances of North American prey carcasses. Arctic. 35(2):266-281.

Detailed description of utilization of different prey species by wolves: what is consumed first, appearance, distance different bones usually are from kill site.

KEY WORDS: predation, depredation

Haynes, G. 1983. A guide for differentiating mammalian carnivore taxa responsible for gnaw damage to herbivore limb bones. Paleobiol. 9(2):164-172.

Describes diagnostic characteristics of damage done by large cats, canids, bears, and hyenas to femora and tibia of herbivores weighing over 300 kg.

KEY WORDS: kill analysis

Heard, D.C. 1983. Historical and present status of wolves in the Northwest Territories. Pages 44-47 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Occupies all of historical range at natural densities. Controlled only if there is evidence that ungulate populations are declining as a result of wolves.

KEY WORDS: management, Canada, Northwest Territories, history, population ecology

Heimer, W.E. and S.M. Watson. 1985. Interior sheep studies. Alaska Dept. Fish and Game, Juneau. Progress Rep., Proj. W-22-1, Job 6.9R.

Wolves controlled in one Ovis dalli range and not in another. Sheep in uncontrolled area continued to decline, began to increase in other. Calculations show relatively small increases or decreases in predation could influence sheep population dynamics. Recommends cautious sheep harvesting in areas with high predation and variable weather.

KEY WORDS: prey biomass, management, Ovis dalli, predation, Alaska

Hendrickson, J., W.L. Robinson, and D.L. Mech. 1975. Status of the wolf in Michigan, 1973. Am. Midl. Nat. 94(1):226-232.

Wolf numbers declined from 45-50 in the mid-1950's to near extinction by 1973. Immigration and sporadic breeding postulated to be factors maintaining present level. Recommend removal of coyote bounty along with public education and reintroduction.

KEY WORDS: distribution, Michigan, relocation

Henshaw, R.E. 1979. Workshop: reintroduction of wolves into the wild. Pages 420-457 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Round table discussion attempts to answer why?, where?, and how? to wolf reintroduction. Release zones should be at least 4,000 sq mi.

KEY WORDS: relocation, range expansion, human attitudes, distribution

Henshaw, R.E. 1982. Can the wolf be returned to New York? Pages 395-422 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Evaluation of the desirability of introducing the wolf to the Adirondacks. Conclusion: a conscious decision must be made whether society desires to manage the ecosystem for natural trophic balance or for man-facilitated stability.

KEY WORDS: range expansion, New York, relocation, human attitudes, depredation

Henshaw, R.E. and R.O. Stephenson. 1974. Homing in the gray wolf Canis lupus. J. Mammal. 55(1):234-237.

Released 5 laboratory-reared wolves in Alaska. All left area travelling in directions toward human habitation. Four killed, 1 returned "home." Most likely they were following auditory cues in the form of aircraft.

KEY WORDS: relocation, dispersal, Alaska

Herbert, D.M., J. Youds, R. Davies, H. Langin, D. Janz, and G.W. Smith. 1982. Preliminary investigations of the Vancouver Island wolf prey relationships. Pages 54-70 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Significant relationships between wolf sightings and black-tailed deer density. Potential for significant impact on deer appears high. Results complicated by habitat changes and weather.

KEY WORDS: predation, censusing, Odocoileus hemionus, Cervus elaphus, Canada, British Columbia

Herman, M. and E.E. Willard. Rocky Mountain wolf and its habitat. U.S. For. Serv. and Mont. For. Conserv. Exp. Stn., Univ. Mont., Missoula.

Historical distribution and population. Present distribution and status.

KEY WORDS: distribution, Idaho, Montana, Wyoming, history

Hoefs, M., H. Hoefs, and D. Burles. 1986. Observations on Dall sheep (Ovis dalli) - grey wolf (Canis lupus pambasileus) in the Kluane Lake Area, Yukon. Can. Field-Nat. 100(1):78-84.

Describes 7 observations of wolf-Dall sheep interactions. Found 3 of these interactions resulted in death of the sheep.

KEY WORDS: Ovis dalli, predation, Yukon

Holleman, D.F. and R.O. Stephenson. 1981. Prey selection and consumption by Alaskan wolves in winter. J. Wildl. Manage. 45(3):620-628.

Application of radiocesium fallout method used. Inexpensive method in areas where wolves and their prey are commonly trapped. Estimate 2.8 kg/wolf/day.

KEY WORDS: predation, prey selection, Alces alces, Rangifer tarandus, Odocoileus hemionus, small prey, consumption

Holleman, D.F., R.G. White, J.R. Luick, and R.O. Stephenson. 1980. Energy flow through the lichen-caribou-wolf food chain during winter in northern Alaska. Pages 202-206 in E. Reimers, E. Gaare, and S. Skjenneberg, eds. Proc. 2nd Int. Reindeer/Caribou Symp., Roros, Norway, 1979.

Fallout radiocesium method used to estimate energy flow. Caribou intake ranged from 2.2 to 3.1 kg/day for 40 kg wolf.

KEY WORDS: physiology, Rangifer tarandus, predation, consumption, Alaska

Hook, D. 1982. A survey of public attitudes toward predators in six Michigan counties. M.A. Thesis. North. Mich. Univ., Marquette.

Direction, strengths, origins, and patterns of formation of attitudes, primarily toward wolves, explored through questionnaire. Best predictors of negative attitude were fear, negative attitude toward animals and the Michigan Department of Natural Resources, and age. Hunters more positive than general public. Majority of those surveyed had positive attitude.

KEY WORDS: human attitudes, Michigan

Hook, R.A. and W.L. Robinson. 1982. Attitudes of Michigan citizens toward predators. Pages 382-394 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Survey conducted. General attitude seems favorable, hunters more favorable than general public.

KEY WORDS: human attitudes, Michigan

Hoskinson, R.L. and L.D. Mech. 1976. White-tailed deer migration and its role in wolf predation. J. Wildl. Manage. 40(3):429-441.

Where deer density is low and predation high, deer most dense at pack borders. Summer deer habitats in those conditions are most often in areas cut over about 70 years past with virgin forest nearby.

KEY WORDS: prey response, prey selection, predation, Odocoileus virginianus, Minnesota

Howard, W.E. and R.H. Schmidt. 1984. Biological rationale for 1080 as a predacide. In D.O. Clark, ed. Proc. 11th Vertebr. Pest Conf., Univ. Calif., Davis.

Compared to others, 1080 is a uniquely selective predacide for coyotes. Discusses biological aspects as well as emotional and political aspects.

KEY WORDS: depredation, management

James, D.D. 1983. Seasonal movements, summer food habits, and summer predation rates of wolves in northwest Alaska. M.S. Thesis. Univ. Alaska, Fairbanks.

Consumed 3.3 to 6.1 kg caribou/wolf/day. Caribou 96% of ungulate biomass consumed. Wolves migratory, high fidelity to summer and winter ranges. If wolves migratory, winter aerial surveys should be interpreted cautiously.

KEY WORDS: Alaska, predation, territory, Rangifer tarandus, scat analysis, human interaction, management, consumption, censusing

- Jenness, S.E. 1985. Arctic wolf attacks scientist--a unique Canadian incident. *Arctic*. 38(2):129-132.

Female wolf in heat attacked scientist's sled dogs in 1915. Before being shot and killed by the mammalogist on the team, it bit one person's arm. Not reported in literature at the time as it was assumed to be normal wolf behavior.

KEY WORDS: human interaction, human attitudes

- Jensen, W.F., T.K. Fuller, and W.L. Robinson. 1986. Wolf, Canis lupus, distribution on the Ontario-Michigan border near Sault Ste. Marie. *Can. Field-Nat.* 100(3):363-366.

High human densities, as indicated by road densities, apparently serve as a barrier to wolf dispersal into Michigan. Evaluation of road densities may aid in estimating the impact of development on established wolf populations, or in predicting likelihood of reestablishing wolves in an area.

KEY WORDS: human interaction, distribution, Ontario, Michigan, relocation

- Johnson, M.K. 1979. Review of endangered species: policies and legislation. *Wildl. Soc. Bull.* 7(2):79-93.

Federal money cannot be used in projects that might jeopardize continued existence of endangered or threatened species. Amendments in 1978 were passed to provide a mechanism for exemption if certain requirements are met.

KEY WORDS: Endangered Species Act and legislation

- Johnson, M.K. and R.M. Hansen. 1977. Comparison of point frame and hand separation of coyote scats. *J. Wildl. Manage.* 41(2):319-320.

Hand separation required 2 hrs/sample. Point-frame required 15 min/sample. Results not significantly different.

KEY WORDS: scat analysis

- Johnson, M.K. and R.M. Hansen. 1978. Estimating dry weights per occurrence for taxa in coyote scats. *J. Wildl. Manage.* 42(4):913-915.

Utilized point-frame method rather than hand separation. Converting taxa to dry weights is recommended for reducing time and effort of analysis.

KEY WORDS: scat analysis

- Johnson, M.K. and R.M. Hansen. 1979. Estimating coyote food intake from undigested residue in scats. *Am. Midl. Nat.* 101(1):363-367.

Dry weights useful for estimating biomass originally ingested. If coyote population density and food intake rates were known, estimates of relative biomass taken from each prey population could be obtained.

KEY WORDS: scat analysis

Jones, G.W. and B. Mason. 1983. Relationship among wolves, hunting, and population trends of black-tailed deer in the Nimpkish Valley on Vancouver Island. Fish and Wildl. Rep. No. R-7. Victoria, BC.

Wolves reduced deer populations and harvests by over 75% in 6 years. Deer held considerably below potential determined by habitat and climactic conditions. Concluded that substantial deer populations could only be maintained if habitat, hunting, and predation are all managed.

KEY WORDS: prey biomass, Odocoileus hemionus, predation, human interaction, Canada, British Columbia

Jordan, P.A., P.C. Shelton, and D.L. Allen. 1967. Numbers, turnover, and social structure of the Isle Royale wolf population. Am. Zool. 7:233-252.

High pup mortality controls population. Recruitment of young appears to take place in years of high moose reproduction.

KEY WORDS: social system, single wolves, population ecology, agonistic behavior, Isle Royale

Jorgensen, S.E., C.E. Faulkner, and L.D. Mech, eds. 1970. Proceedings of a symposium on wolf management in selected areas of North America. U.S. Fish and Wildl. Serv., Reg. 3, Twin Cities, MN. 50pp.

Papers presented on current status and management of wolves in areas included in key words. Includes "Implications of wolf ecology to management" by L.D. Mech and "Some philosophical considerations about wolf management" by D.L. Allen.

KEY WORDS: management, Endangered Species Act and legislation, Manitoba, Wisconsin, Michigan, Ontario, Alaska, Europe

Joslin, P. 1982. Status, growth, and other facets of the Iranian wolf. Pages 196-203 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Limited information recorded on Iranian wolf. Reviews existing data regarding status, time of birth, den description, taxonomy, growth, blood analysis, vocalization, prey selection, and attacks on humans.

KEY WORDS: physiology, Europe

Kaminski, T. and A. Boss. 1981. Gray wolf--the history, present status, and management recommendations. Boise Natl. For., Boise, ID. 111pp.

Low density of wolves in Boise National Forest. Probably dispersers, no reproduction documented.

KEY WORDS: history, management, Idaho, distribution, Endangered Species Act and legislation

Kaminski, T. and J. Hansen. 1984. Wolves of central Idaho. Mont. Coop. Wildl. Res. Unit. U.S. Fish and Wildl. Serv., Missoula, MT. 196pp.

Current population probably consists of lone wolves dispersing south. History of wolves in Idaho delineated.

KEY WORDS: Idaho, distribution, management, history

Keith, L.B. 1983. Population dynamics of wolves. Pages 66-77 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Rates of increase determined mainly by ungulate food supply. Compensatory increases in reproduction and pup survival permit an estimated sustained harvest of about 30% of fall populations. Estimated maximum "r" of 0.304.

KEY WORDS: prey biomass, harvesting, population ecology, population regulation, management, predation, prey response, modeling

Kellert, S.R. 1985. Public perceptions of predators, particularly the wolf and coyote. Biol. Conserv. 31(2):167-189.

Wolves and coyotes were relatively disliked by public. Positive attitude toward wolves and coyotes highly correlated with affection for animals and desire to protect wildlife habitat. Opposed nonspecific and inhumane control measures.

KEY WORDS: human attitudes

Kellert, S.R. 1985. The public and the timber wolf in Minnesota. Yale Univ., New Haven, CT. 175pp.

Strong positive perception (except farmers) to wolves by Minnesotans. Believe in humane, targeted control. Support for continued wolf populations but not at expense of important human needs.

KEY WORDS: human attitudes, Minnesota

Kellert, S.R. 1987. The public and the timber wolf in Minnesota. Anthrozoos 1(2):100-109.

Limited knowledge of wolf shown by general public. Most supported wolf conservation, but not at the expense of important human needs.

KEY WORDS: human attitudes, Minnesota

Kennedy, A.J. 1982. Distinguishing characteristics of the hairs of wild and domestic canids from Alberta. Can. J. Zool. 60(4):536-541.

Hair of Canis lupus, Canis latrans, Canis familiaris, and Vulpes vulpes examined. Cannot distinguish coyote from wolf but all others are separable.

KEY WORDS: hair analysis

Kie, J.G., M. White, and F.F. Knowlton. 1979. Effects of coyote predation on population dynamics of white-tailed deer. Pages 65-82 in D.L. Drawe, ed. Proc. 1st Welder Wildl. Foundation Symp., Corpus Christi.

Texas. Deer not subjected to predation increased in density causing decreased reproductive rate and increased 3-12 month age mortality. Mortality of adult deer did not increase enough to cause reduction in numbers until 4-5 years after predator control.

KEY WORDS: predation, Canis latrans, Odocoileus virginianus

Klinghammer, E. 1979. The behavior and ecology of wolves. Garland STPM Press, NY. 588pp.

Proceedings of the symposium on the behavior and ecology of wolves.

KEY WORDS: general

Klinghammer, E. and L. Laidlow. 1979. Analysis of 23 months of daily howl records in a captive grey wolf pack Canis lupus. Pages 153-181 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Identified 2 peaks of howling, morning and late in afternoon. Solo howls increase sharply in early part of breeding season.

KEY WORDS: communication, social system

Knick, S.T. and L.D. Mech. 1980. Sleeping distance in wild wolf packs. Behav. Neural Biol. 28:507-511.

Pack size and number of adults per pack inversely related to average sleeping distance and variability of distance. Hypothesis suggested.

KEY WORDS: behavior, activity patterns

Kolczak, L. 1986. To track a wolf. Earthwatch 5(2):14-19.

Description of study monitoring wolves continuously for 36-hour periods.

KEY WORDS: behavior, activity patterns, Minnesota, telemetry, general interest

Kolenosky, G.B. 1972. Wolf predation on wintering deer in east-central Ontario. J. Wildl. Manage. 36(2):357-369.

Average daily travel in winter 7.1 km. Pack of 8 consumes 1 deer/2.2 days. Distance between kills averaged 14.7 km. Killed deer were slightly older and more males than hunter-killed deer.

KEY WORDS: territory, activity patterns, prey selection, Odocoileus virginianus, Canada, Ontario, consumption, predation

Kolenosky, G.B. 1983. Status and management of wolves in Ontario. Pages 35-40 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Classified as furbearer, controlled for protection of livestock and in white-tailed deer wintering areas.

KEY WORDS: Canada, Ontario, management, history, population ecology, depredation, Odocoileus virginianus, predation

Kruuk, H. 1972. Surplus killing by carnivores. J. Zool. 166(2):233-244.

Deals with several predators. Suggests that satiation inhibits searching but does not inhibit catching. Several prey species showed a lack of anti-predator reaction under particular climatological conditions. It is argued that this lack of response usually has survival value but, under certain conditions, is ineffective.

KEY WORDS: prey selection, predation, surplus killing

Kuehn, D.W., T.K. Fuller, L.D. Mech, W.J. Paul, S.H. Fritts, and W.E. Berg. 1986. Trap-related injuries to gray wolves in Minnesota. J. Wildl. Manage. 50(1):90-91.

Wolves captured in traps with toothed jaws offset 1.8 cm incurred fewer injuries than those captured in 3 other types of traps. Few wolves seriously damaged their teeth.

KEY WORDS: capture, injuries and accidents

Kuyt, E. 1972. Food habits and ecology of wolves on barren-ground caribou range in the Northwest Territories. Can. Wildl. Serv. Rep. Ser. No. 21. 36pp.

May migrate 200 miles, movements associated with caribou movements. Eat only caribou in winter, caribou and small prey in summer. During maximum compression in winter, densities of 1 wolf/6.9 sq mi were reached.

KEY WORDS: predation, hunting techniques, Rangifer tarandus, territory, Canada, Northwest Territories, small prey

Linhart, S.B., G.J. Dasch, and F.J. Turkowski. 1980. The steel leg-hold trap: techniques for reducing foot injury and increasing selectivity. Pages 1560-1578 in J.A. Chapman and D. Pursley, eds. Proc. Worldwide Furbearer Conf., August 3-11, 1980, Frostburg, MD.

Field test done to improve selectivity and reduce injury of trapped coyotes. No injury in 90% of coyotes taken in traps affixed with tranquilizing tabs. Shortened chains did not reduce injury. Initial results of 2 trap-pan tension devices encouraging for increasing selectivity.

KEY WORDS: capture, injuries and accidents

Lockwood, R. 1979. Dominance in wolves: useful construct or bad habit? Pages 225-244 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Looks at reliability of "dominance" concept in wolf pack. "Dominance" could be identified but many traditional views of the attribute were not supported. Alternative approaches suggested: role theory, subordination hierarchies, and attention structure.

KEY WORDS: behavior, social system, agonistic behavior

Lopez, B.H. 1978. Of wolves and men. Charles Scribner's Sons, NY. 309pp.

Primarily discusses mythology surrounding wolves, historical perspectives.

KEY WORDS: human attitudes, human interaction, general, history, general interest

Lord, M.W. 1984. District Court ruling on proposed sport trapping of Minnesota wolves. Defenders Mar/Apr:11-15.

Judge Lord's decision to deny a sport season on wolves.

KEY WORDS: Endangered Species Act and legislation, general interest

Lyons, C.A., P.M. Ghezzi, and C.D. Cheney. 1982. Reinforcement of cooperative behavior in captive wolves. Pages 262-271 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Discusses general issue of experimentally analyzing cooperation in wolves, and initial attempts at such analysis.

KEY WORDS: behavior, social system

Mahrenke, P., III. 1971. Observation of four wolves killing another wolf. J. Mammal. 52(3):630-631.

See title.

KEY WORDS: agonistic behavior, Alaska, behavior

Mattson, U. 1983. Search for wolves. Persimmon Hill 13(3):37-51.

General interest article detailing history of wolves in Montana. Description of behavior, current knowledge.

KEY WORDS: general, behavior, Endangered Species Act and legislation, Montana, general interest

Mattson, U. and R.R. Ream. 1979. Wolf ecology project. Pages 57-58 in K.L. McArthur, ed. 1978 Annual Res. Summ. Glacier Natl. Park., MT.

Montana. Consistent reports of wolves from 3 areas: (1) North Fork of the Flathead River; (2) Southeast portion of Glacier National Park from Fielding to E. Glacier; (3) St. Mary northward to Waterton National Park.

KEY WORDS: distribution, Montana

McAdoo, J.K. and D.A. Klebenow. 1978. Predation on range sheep with no predator control. J. Range Manage. 31(2):111-114.

Discusses coyote and bobcat depredation on a closely monitored ranch. Predation rate of 3.8% on total flock (6.3% on lambs) from June through Sept. Predation major cause of sheep losses.

KEY WORDS: depredation, management, sheep

McNamee, T. 1986. Yellowstone's missing element. Audubon 88(1):12-19.

Political status of wolf reintroduction to Yellowstone. Momentum for reintroduction building. Political climate becoming more receptive.

KEY WORDS: relocation, human attitudes, general interest, Yellowstone

McNaught, D.A. 1985. Park visitors' attitudes towards wolf recovery in Yellowstone National Park. M.S. Thesis. Univ. Mont., Missoula. 103pp.

Large majority of park visitors favor a return of wolves to Yellowstone. Favor reintroduction. Do not feel that wolf recovery should be subordinated to various human interests.

KEY WORDS: human attitudes, Yellowstone

McNaught, D.A. 1987. Wolves in Yellowstone National Park?--park visitors respond. Wildl. Soc. Bull. 15(4):518-521.

Yellowstone National Park visitors strongly favored reintroduction of wolves to Yellowstone.

KEY WORDS: human attitudes, relocation, Yellowstone

Mech, L.D. 1966. Hunting behavior of timber wolves in Minnesota. J. Mammal. 47(2):347-348.

Hunting seems incidental to travel. Healthy deer, if have a head start, can easily outdistance wolves.

KEY WORDS: hunting techniques, predation, prey response, Odocoileus virginianus, Minnesota

Mech, L.D. 1966. The wolves of Isle Royale. U.S. Natl. Park Serv. Fauna Ser. 7. 210pp.

Field study in 1959 and 1960 to appraise wolf-moose relationships. Wolf and moose in dynamic equilibrium. Predation efficiency of 7.8%.

KEY WORDS: general, activity patterns, Isle Royale, Alces alces, predation, consumption

Mech, L.D. 1967. Telemetry as a technique in the study of predation. J. Wildl. Manage. 31(3):492-496.

Suggestions made for use of telemetry in studies of predation: (1) radiotagging large numbers of a single prey species; (2) monitoring the location of each individual every 12 hrs; (3) prompt investigation of all suspected mortality.

KEY WORDS: telemetry, predation

Mech, L.D. 1970. The wolf: the ecology and behavior of an endangered species. Nat. Hist. Press, Garden City, NY. 384pp.

Covers all aspects of wolf biology and ecology.

KEY WORDS: general

Mech, L.D. 1971. Wolves, dogs, coyotes. Pages 19-22 in M.E. Nelson, ed. Proc. Symp. on White-tailed Deer in Minnesota. Minn. Chap. The Wildl. Soc.

Speculates that under the previous 10 years hunting regulations, weather conditions and other circumstances in Minnesota that wolves would not reduce deer numbers.

KEY WORDS: Odocoileus virginianus, Minnesota

Mech, L.D. 1972. Spacing and possible mechanisms of population regulation in wolves. Am. Zool. 12(4):642 (abstract).

Packs limited in size by dispersal of younger members becoming lone wolves. Mortality factors included attacks from other wolves, starvation and disease, and human-related causes.

KEY WORDS: population regulation, Minnesota

Mech, L.D. 1972. Wolf-pack buffer zones as prey reservoirs. Science 198(4314):320-321.

When deer populations are low, they are most dense between pack territories. Theory implies stable wolf territories over long periods. Dispersing deer regenerate cores. Buffer zones constitute 25-40% of a region.

KEY WORDS: Odocoileus virginianus, prey response

Mech, L.D. 1973. Wolf numbers in the Superior National Forest of Minnesota. For. Serv. Res. Paper NC-97, North Cent. For. Exp. Stn., St. Paul, MN. 10pp.

Overview of censuses from 1938. Current estimate derived from telemetry is 400/4,203 sq mi.

KEY WORDS: Endangered Species Act and legislation, telemetry, censusing, history, population ecology

Mech, L.D. 1974. Canis lupus. Mammalian Species No. 37:1-6. Am. Soc. Mammal. 6pp.

Summary of ecology, behavior, distribution, and taxonomy.

KEY WORDS: taxonomy, general

Mech, L.D. 1974. Current techniques in the study of elusive wilderness carnivores. Pages 315-322 in Proc XIth Int. Congr. Game Biol., Stockholm.

Live trapping, radio-tagging, and aerial radio-tracking discussed in context of their value in studying elusive wilderness carnivores.

KEY WORDS: telemetry

Mech, L.D. 1974. A new profile for the wolf. Nat. Hist. 83(4):26-31.

General article updating scientific knowledge for public. Have dampening effect on prey populations. Wolf density depends on prey density.

KEY WORDS: territory, Odocoileus virginianus, general interest, predation

Mech, L.D. 1975. Disproportionate sex ratios of wolf pups. J. Wildl. Manage. 39(4):737-740.

Minnesota. Found 66% male pups from high-density areas, equal or disproportionate share of females in low density wolf areas.

KEY WORDS: physiology, population ecology, population regulation, Minnesota

Mech, L.D. 1975. Hunting behavior in two similar species of social canids. Pages 363-368 in M.W. Fox, ed. The wild canids; their systematics, behavioral ecology, and evolution. Van Nostrand Reinhold Co., NY.

Compares hunting behavior of wolves and cape hunting dogs. Chase usually given up within 3 km. Much similarity between 2 species. Detailed description of sequence of hunt.

KEY WORDS: consumption, hunting techniques, behavior

Mech, L.D. 1977. Population trend and winter deer consumption in a Minnesota wolf pack. Pages 55-86 in R.L. Phillips and C. Jonkel, eds. Proc. 1975 Predator Symp., Mont. For. Conserv. Exp. Stn., Univ. Mont., Missoula.

Consumed 1.5-5.8 kg meat/wolf/day, declined with declining prey base. As prey decreased, blood chemistries became more deviant, kills became more scattered, pack size decreased, alpha pair did not reproduce.

KEY WORDS: physiology, territory, activity patterns, prey response, consumption, population ecology, Odocoileus virginianus, Minnesota

Mech, L.D. 1977. Productivity, mortality, and population trends of wolves in northeastern Minnesota. J. Mammal. 58(4):559-574.

Population parameters studied 1968-76. Decline in numbers probably due to low density of white-tailed deer. Found 1.5-3.3 pups/litter, mortality 7-65%. Malnutrition and intraspecific strife accounted equally for 58% of mortality, humans for 42%.

KEY WORDS: Minnesota, physiology, population regulation, agonistic behavior, population ecology, management

Mech, L.D. 1979. Making the most of radio tracking--a summary of wolf studies in northeastern Minnesota. In C.J. Amlaner, Jr. and D.W. MacDonald, eds. A handbook on biotelemetry and radio-tracking. Pergamon Press, Oxford.

Recommends collecting blood samples and as much other data as possible when capturing animals. Also the need for long-term studies.

KEY WORDS: Minnesota, physiology, population ecology, dispersal, predation, human interaction, population regulation, territory

Mech, L.D. 1979. Some considerations in re-establishing wolves in the wild. Pages 445-457 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Reintroduction should be considered only with: 1) a thorough preliminary study, 2) no remaining native populations, 3) a specific target area and wolves going outside being killed, 4) wild wolves feeding on wild prey, and 5) close monitoring.

KEY WORDS: relocation, depredation, human attitudes

Mech, L.D. 1979. Why some deer are safe from wolves. Nat. Hist. 88(1):71-74.

Discusses why deer are more dense along wolf territory boundaries. Non-technical.

KEY WORDS: prey response, territory, general interest

Mech, L.D. 1982. The IUCN-SSC wolf specialist group. Pages 327-333 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Describes group. Includes table of information for the group's world conservation strategy for wolves.

KEY WORDS: general

Mech, L.D. 1982. Wolves (radio-tracking). Pages 227-228 in D.E. Davis, ed. *CRC handbook of census methods for terrestrial vertebrates*. CRC Press, Inc., Boca Raton, FL.

Discusses using radio-telemetry to locate packs. Suggests several mid-winter counts followed by spring counts so mortality and dispersal is accounted for. This is only method he feels is accurate, though howling may have potential.

KEY WORDS: censusing, telemetry

Mech, L.D. 1985. How delicate is the balance of nature? *Natl. Wildl. Feb-Mar.*:54-58.

Explains in nonscientific terms why wolf-control programs are sometimes necessary if object is to keep high prey and predator populations.

KEY WORDS: general interest, predation, management

Mech, L.D. 1986. Wolf numbers and population trends in the Superior National Forest, 1967-1985. U.S. Dept. Agric., For. Serv. North Central For. Exp. Stn. Res. Paper NC-270. St. Paul, MN. 6pp.

Traces wolf numbers in Superior National Forest, especially as to how they relate to deer numbers.

KEY WORDS: Minnesota, population ecology, Odocoileus virginianus

Mech, L.D., R.C. Chapman, W.W. Cochran, L. Simmons, and U.S. Seal. 1984. Radio-triggered anesthetic-dart collar for recapturing large mammals. *Wildl. Soc. Bull.* 12(1):69-74.

Describes use and construction of reusable, radio-triggered, anesthetic-dart collar costing \$1200. Field-tested on wolves, bear, and deer after periods of up to 32 days.

KEY WORDS: capture

Mech, L.D. and G.D. Del Giudice. 1985. Limitations of the marrow-fat technique as an indicator of body condition. *Wildl. Soc. Bull.* 13(2):204-206.

If marrow has lost any fat, the individual probably is in poor condition. If marrow is fully fat, all that can be concluded is that the animal is not necessarily in poor condition, but that it still may be.

KEY WORDS: kill analysis

Mech, L.D. and L.D. Frenzel. 1971. Ecological studies of the timber wolf in northeastern Minnesota. For. Serv. Paper NC-52, North Cent. For. Exp. Stn., St. Paul, MN. 62pp.

Aerial observations and telemetry showed ranges of 43-1000 sq mi. Killed 1 deer/wolf/18 days, more in harsh winter. Wolf-killed deer generally older and had more abnormalities than hunter-killed. Contains four articles by Mech and other researchers.

KEY WORDS: predation, prey selection, Odocoileus virginianus, territory, Minnesota, consumption

Mech, L.D., S.H. Fritts, G.L. Radde, and W.J. Paul. 1988. Wolf distribution and road density in Minnesota. Wildl. Soc. Bull. 16:85-87.

Data is consistent with Thiel (1985). Wolves generally do not occur where road densities exceed 0.58 km/sq km.

KEY WORDS: distribution, human interaction, Minnesota

Mech, L.D., S. Goyal, C. Bota, and U.S. Seal. 1986. Canine parvovirus infection in wolves Canis lupus from Minnesota. J. Wildl. Dis. 22(1):104-106.

Found 57% of captured wolves from 198-1983 showed high titers of CPV HI. No conclusive evidence of it as cause of mortality or morbidity in wild wolves.

KEY WORDS: parasites and disease, Minnesota

Mech, L.D. and Hertel. 1983. An eight-year demography of a Minnesota wolf pack. Acta Zool. Fenn. 174:249-250.

Pack followed for 8 years. Small territory of 77 sq km. Regularly utilized garbage landfill as food source. Generally dispersed between 10 and 31 months.

KEY WORDS: Minnesota, population ecology, dispersal, territory, human interaction

Mech, L.D. and P.D. Karns. 1977. Role of the wolf in a deer decline in the Superior National Forest. U.S. For. Serv. Res. Paper NC-148. 23pp.

Divides area into zones, one with many wolves, one with few. Appears deer declined in both due to habitat changes and severe winters but began to recover in area without wolves. Uses Minnesota Department of Natural Resources' deer population management model (SNOPOP).

KEY WORDS: prey biomass, prey selection, predation, prey response, Minnesota, Odocoileus virginianus, modeling, surplus killing

Mech, L.D. and S.T. Knick. 1978. Sleeping distance in wolf pairs in relation to the breeding season. *Behav. Biol.* 23(4):521-525.

Minnesota. Wolf pairs slept closer together during proestrus and first half of breeding season than thereafter.

KEY WORDS: activity patterns, behavior, breeding strategy, Minnesota

Mech, L.D. and M. Korb. 1978. An unusually long pursuit of a deer by a wolf. *J. Mammal.* 59(4):860-861.

A 2.5-year-old female wolf pursued a doe at least 20.8 km. Alpha animals abandoned chase much earlier. Longest previous recorded chase was 6.0 km.

KEY WORDS: predation, Odocoileus virginianus, hunting techniques

Mech, L.D. and R.M. Nowak. 1981. Return of the gray wolf to Wisconsin. *Am. Midl. Nat.* 105(2):408-409.

Examined 5 gray wolves from 1975-79, each killed by humans.

KEY WORDS: Wisconsin, distribution, human interaction

Medjo, D.C. and L.D. Mech. 1976. Reproductive activity in nine and ten month old wolves. *J. Mammal.* 57(2):406-408.

Descriptions of several second generation captive-raised wolves showing signs of estrous. One pup born. Nutrition and/or lack of hormonal inhibition due to lack of social interaction may be responsible.

KEY WORDS: population ecology, physiology, breeding strategy

Mendelssohn, H. 1982. Wolves in Israel. Pages 173-195 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Garbage forms high percentage of diet. Most information on life history anecdotal. Food supplied at feeding stations by Nature Reserves Authority (funded by World Wildlife) in some areas.

KEY WORDS: Europe, population ecology, predation, human interaction, nonprey interactions, management

Mendelssohn, H. 1983. Conservation of the wolf in Israel. *Acta Zool. Fenn.* 174:281-282.

Wolves found in 50% of Israel's area. Protected since 1954. Depredation not a large problem. About 150 wolves. Competition with feral dogs and hybridization are problems.

KEY WORDS: management, depredation, human attitudes, Europe, competition, dog, genetics

Mendelssohn, H. 1983. Status of the wolf in the Middle East. Acta Zool. Fenn. 174:279-280.

Wolves rare, distribution not continuous. Feed mainly on livestock carcasses and garbage. Survival depends on human attitudes.

KEY WORDS: management, human attitudes, Europe

Merriam, H.R. 1964. The wolves of Coronation Island. Pages 27-32 in Proc. 15th Alaskan Sci. Conf., Anchorage, AK.

To date description of history and population dynamics of the Coronation Island relocation experiment.

KEY WORDS: relocation, Alaska, population ecology, range expansion

Merriam, H.R. 1966. Alaska wildlife investigations. Big game investigations. Sitka black-tailed deer. Alaska Dept. Fish and Game, Proj. W-6-R-6, Work Plan A, and W-15-R-1, Work Plan J, Juneau. 22pp.

Update on findings from Coronation Island wolf introduction. Deer declining. Some evidence of intraspecific strife. Less deer in scats, more miscellaneous.

KEY WORDS: predation, Odocoileus hemionus, prey response, Alaska, relocation, range expansion

Merriam, H.R. 1968. Big game investigations. Sitka black-tailed deer. Alaska Dept. Fish and Game, Proj. W-15-R-2 and 3, Work Plan J, Juneau. 29pp.

Alaska. Preliminary results of Coronation Island wolf introduction. Under optimum conditions wolves did not approach their potential productivity. Deer population crashed but may be increasing after wolves crashed. Estimate one wolf remaining on island.

KEY WORDS: predation, Odocoileus hemionus, prey response, Alaska, population ecology, population regulation, relocation, range expansion

Messier, F. 1985. Social organization, spatial distribution, and population density of wolves in relation to moose density. Can. J. Zool. 63(5):1068-1077.

Canada. Study for 4 years compared population density and related behavioral attributes of wolf packs in area of low moose density to area of high density. Wolf density correlated with prey abundance.

KEY WORDS: territory, dispersal, population ecology, population regulation, predation, Alces alces, Castor canadensis, behavior, Canada

Messier, F. 1985. Solitary living and extraterritorial movements of wolves in relation to social status and prey abundance. *Can. J. Zool.* 63(2):239-245.

Canada. Study examines 3 factors encouraging wolf dispersal and solitary living: prey abundance, age, sex. Prey abundance had no effect on pups, increased both in yearlings, increased only solitary living in adults. Yearling females travelled more outside territories than males.

KEY WORDS: prey biomass, dispersal, territory, Canada, single wolves

Messier, F. 1987. Physical condition and blood physiology of wolves in relation to moose density. *Can. J. Zool.* 65:91-95.

In the absence of other ungulate species, wolves were nutritionally stressed when moose densities decreased below 0.4/sq km. Sharp decrease in predation rate at this lower moose density seems attributable to the direct effects of malnutrition on wolf numbers.

KEY WORDS: physiology, Alces alces, population regulation, Canada

Messier, F. and C. Barrette. 1985. The efficiency of yarding behavior by white-tailed deer as an antipredator strategy. *Can. J. Zool.* 63:785-789.

Utilized track and pellet densities to determine deer density. Related density to predator-killed deer (primarily coyote). Found coyotes preferred low deer density areas. Found 18 of 23 coyote-killed deer in low deer density area.

KEY WORDS: Odocoileus virginianus, prey response

Messier, F. and M. Crete. 1985. Moose-wolf dynamics and the natural regulation of moose populations. *Oecologia* 65:503-512.

Canada. Conclude that moose populations at low densities are regulated largely by predators. Wolves may have compensatory effect at higher moose densities.

KEY WORDS: consumption, prey selection, modeling, Alces alces, predation, scat analysis, population regulation, Canada

Miller, D.R. 1979. Wolf-caribou-human interactions on the taiga of northcentral Canada during winter. Pages 93-116 in E. Klinghammer, ed: *The behavior and ecology of wolves*. Garland STPM Press, NY.

Caribou more vulnerable to predation during certain winters. Ones that fail to synchronize movements with others are selected. Caribou increase their vulnerability to man when they seek treeless areas to escape from wolves.

KEY WORDS: Rangifer tarandus, predation, prey selection, human interaction, prey response

Miller, F.L. 1983. Wolf-related caribou mortality on a calving ground in northcentral Canada. Pages 100-101 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Wolf predation accounted for 31.6% of newborn caribou mortality. Apparently healthy calves taken so not compensatory. Since other mortality factors cannot be controlled, wolf control is recommended.

KEY WORDS: prey response, predation, Rangifer tarandus, prey selection

Miller, F.L., A. Gunn, and E. Broughton. 1985. Surplus killing as exemplified by wolf predation on newborn caribou. Can. J. Zool. 63(2):295-300.

Found 34 caribou calves killed by wolves in 3-sq-km area. Found 17 untouched. Attribute surplus killing of newborn calves to their high density and vulnerability. Recommend that distinction be made between "surplus killing" and "excessive killing."

KEY WORDS: predation, Rangifer tarandus, prey selection, behavior, Canada, surplus killing

Miller, F.L. and R.H. Russell. 1977. Unreliability of strip aerial surveys for estimating numbers of wolves in western Queen Elizabeth Islands, Northwest Territories. Can. Field-Nat. 91(1):77-81.

Wolf numbers obtained by 6 transect-strip "census" aerial surveys flown each year for 3 years were compared to ground observations. Aerial surveys usually misleading.

KEY WORDS: censusing, Canada, Northwest Territories

Miller, G. 1969. A study of cuts, grooves, and other marks on recent and fossil bone. I: animal tooth marks. Tebiwa 12(1):20-26.

Marks made by captive animals while chewing and gnawing on fresh bones are discussed. Black and white photos.

KEY WORDS: kill analysis

Minnesota Department of Natural Resources. 1980. Minnesota timber wolf management plan. Minn. Dept. Nat. Resour. 19pp.

Proposes 9-part management program. Wolf would be managed by State instead of Federal government.

KEY WORDS: Endangered Species Act and legislation, management, history, Minnesota

Mitchell, J.G. 1976. Fear and loathing in wolf country. Audubon 78(3):20-39.

Interviews people in areas where there are wolves, delves into feelings, reasons for them. Chronicles history of wolf management in Alaska.

KEY WORDS: human attitudes, history, human interaction, general interest

Moore, T.D., L.E. Spence, C.E. Dugnoles. 1974. Identification of the dorsal guard hairs of some mammals of Wyoming. Wyo. Fish and Game Dept. Cheyenne. Bull. No. 14. 177pp.

Techniques and methods for identifying hair. Has keys and photographs.

KEY WORDS: kill analysis, hair analysis

Moran, G. and J.C. Fentress. 1979. A search for order in wolf social behavior. Pages 245-283 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Demonstrates how a search for ordering principles in wolf social behavior can be facilitated by employing explicitly defined and complimentary descriptive criteria.

KEY WORDS: behavior, social system

Munthe, K. and J.H. Hutchison. 1978. A wolf-human encounter on Ellesmere Island, Canada. J. Mammal. 59(4):876-878.

Account of aggressive encounter by wolf where 6 wolves approached 2 people to within 4 m. One leapt forward, grazed one person's cheek and then all retreated.

KEY WORDS: human interaction, Canada

Murie, A. 1944. The wolves of Mount McKinley. U.S. Natl. Park Serv. Fauna Ser. 5. 238pp.

Field study from 1939-41, particularly wolf-Dall sheep relationships, but also includes interaction between grizzlies, caribou, moose, fox, and eagle. Wolves and prey seem to be in equilibrium.

KEY WORDS: general, Ovis dalli, nonprey interactions, Alaska

Nelson, M.E. and L.D. Mech. 1981. Deer social organization and wolf predation in northeastern Minnesota. Wildl. Monogr. 77. 53pp.

Deer's annual life cycle seems adapted to avoiding wolf predation. Solitary living in summer minimizes fawn predation. In winter, deer group together and spread risk of predation throughout the group.

KEY WORDS: prey response, Odocoileus virginianus, Minnesota

Nelson, M.E. and L.D. Mech. 1984. Observation of a swimming wolf killing a swimming deer. J. Mammal. 65(1):143-144.

Observed a wolf kill a deer in lake after it had swam for 4.7 hours. Small lakes and streams are not refuges as wolves intercept deer as they try to land. Wolves usually do not enter water.

KEY WORDS: prey response, Minnesota, Odocoileus virginianus

Nelson, M.E. and L.D. Mech. 1985. Observation of a wolf killed by a deer. J. Mammal. 66(1):187-188.

Apparently healthy buck killed by 4 wolves on plowed road. Deep fluffy snow probably prevented escape. One wolf killed apparently by antler puncture. Unusual for deer to react this way toward wolves.

KEY WORDS: Odocoileus virginianus, predation, hunting techniques, injuries and accidents, prey selection

Nelson, M.E. and L.D. Mech. 1986. Mortality of white-tailed deer in northeastern Minnesota. J. Wildl. Manage. 50(4):691-698.

Radiotracked 209 white-tailed deer from 1973 through winter of 1983-1984. Most mortality occurred from January through April when wolf predation was an important mortality source for all calves. Yearling males were most vulnerable to hunting and adult males to wolf predation.

KEY WORDS: predation, Odocoileus virginianus, prey response, prey selection, Minnesota

Nelson, M.E. and L.D. Mech. 1986. Relationship between snow depth and gray wolf predation on white-tailed deer. J. Wildl. Manage. 50(3):471-474.

Mean wolf predation rate ranged from 0.00-0.29. The sum of weekly snow depths/month explained 51% of the variation in annual wolf predation rates.

KEY WORDS: Odocoileus virginianus, population ecology, predation, prey response

Nelson, M.E. and L.D. Mech. 1986. White-tailed deer numbers and population trend in the central Superior National Forest, 1967-85. U.S. For. Serv. Res. Paper NC-271. 8pp.

Deer population in yard near human habitation stabilized from 1977-1978 to 1982-1983 after large decline beginning in late 1960's. Deer in isolated yards continued to decline.

KEY WORDS: Odocoileus virginianus, predation, prey response, prey selection

Nelson, U.C. and E.F. Chatelain. 1949. Completion report making investigations on the methods for control of coyotes and wolves in Alaska. Alaska Dept. Fish and Game, Juneau, Proj. W-3-R-3, Work Plan 1, Job No. 1. Vol. III, No. 3. 2pp.

Lard-covered bait more effective than blubber. Ground-placed bait stations more effective than airplane-dropped.

KEY WORDS: management, Alaska

Nevin, D. 1985. Revered and reviled, Minnesota's wolves are in trouble again. *Smithsonian* 15(10):78-86.

Discusses political status of Minnesota's wolves, general biology, place in mythology.

KEY WORDS: human attitudes, general, general interest, Minnesota

Nowak, R.M. 1983. A perspective on the taxonomy of wolves in North America. Pages 10-19 in L.N. Carbyn, ed. *Wolves in Canada and Alaska*. Can. Wildl. Serv. Rep. Ser. 45.

Hypothesizes that wolves should be split into 2 groups: one roughly north of the U.S.-Canadian border, the other south. Northern wolves were isolated in Alaska by the late Pleistocene glaciation.

KEY WORDS: taxonomy, distribution

O'Gara, B.W. 1978. Differential characteristics of predator kills. Pages 380-393 in Proc. 8th Biennial Pronghorn Antelope Workshop, Jasper, Alberta.

Description of how to determine if animal was a predator kill and, if so, what type. Describes coyote, dog, bobcat, bear, eagle, and cougar kills.

KEY WORDS: predation, depredation, kill analysis

O'Gara, B.W. 1982. Let's tell the truth about predation. Pages 476-484 in Tran. 47th North Am. Wildl. Nat. Resour. Conf., Wash., DC.

Prejudice and hysteria about depredation and control needs to be dealt with. Environmental community and livestock producers both being hurt by misunderstanding.

KEY WORDS: depredation, general interest

Okarma, H. 1984. The physical condition of red deer falling a prey to the wolf and lynx and harvested in the Carpathian Mountains. *Acta Theriol.* 29(23):283-290.

Lynx killed only calves, with 82% in weak condition. Wolf-killed calves were about 50% in good condition and 50% in bad. Hypothesizes that in mountainous areas with high prey populations the criteria of selection becomes both prey condition and behavior.

KEY WORDS: Cervus elaphus, Lynx canadensis, Europe, prey selection, hunting techniques, prey response

Oosenbrug, S.M. and L.N. Carbyn. 1980. Winter predation on bison and activity patterns of a pack of wolves in Wood Buffalo National Park. Can. Wildl. Serv. Paper presented at Portland, OR, Wolf Symp., Aug. 1979. 22pp.

Found 5.3kg/wolf/day. Complete utilization. Excluding stays at kills and carcasses, the pack averaged 8.8 km/day. Wolves selected for adult male bison.

KEY WORDS: Bison bison, Canada, Alberta, consumption, activity patterns, prey selection

Oosenbrug, S.M. and L.N. Carbyn. 1982. Winter predation on bison and activity patterns of a wolf pack in Wood Buffalo National Park. Pages 43-53 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Pack of 10 wolves killed one bison about every 8 days in winter. Consumed 5.3 kg/wolf/day. High utilization of prey. Winter range for the pack was 490 sq km. Average 8.8 km/day. High proportion of adult male bison preyed upon.

KEY WORDS: Bison bison, Canada, Alberta, territory, activity patterns, predation, prey selection

Packard, J.M. 1980. Deferred reproduction in wolves Canis lupus. Ph.D. Thesis. Univ. Minn., Minneapolis. 337pp.

Reproductive failure in wolf packs more appropriately viewed as deferred reproduction than endocrine suppression. Potential implications of deferred reproduction discussed.

KEY WORDS: population ecology, population regulation, management, modeling, dispersal, agonistic behavior, behavior, social system, breeding strategy

Packard, J.M. and L.D. Mech. 1980. Population regulation in wolves. Pages 135-150 in M.N. Cohen, R.S. Malpass, and H.G. Klein, eds. Biosocial mechanisms of population regulation. Yale Univ. Press, New Haven.

Social behavior seems to be proximate cause of numerical change which is ultimately controlled by food. Loose feedback tends to foster predator-prey oscillations.

KEY WORDS: dispersal, territory, behavior, population regulation, physiology, modeling, prey biomass

Packard, J.M. and L.D. Mech. 1983. Population regulation in wolves. Pages 151-174 in F.L. Bunnell, D.S. Eastman, and J.M. Peek, eds. Symp. Nat. Regulation Wildl. Populations, Mar. 10, 1978. For. Wildl. and Range Exp. Stn., Univ. Idaho, Moscow.

Argues that intrinsic limitations of population (territoriality, exclusive breeding by dominant individuals, etc.) are proximate and that ultimate factor is food supply. Suggest different reproductive strategies (biders vs. dispersers).

KEY WORDS: population regulation, population ecology, territory, dispersal, breeding strategy

Packard, J.M., L.D. Mech, and U.S. Seal. 1983. Social influences on reproduction in wolves. Pages 8-85 in L.N. Carbyn, ed. Wolves of Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Of all adult females, 38% fail to reproduce each year usually due to lack of copulation. Models of wolf populations should consider individual pack history and social composition.

KEY WORDS: behavior, agonistic behavior, population regulation, population ecology, management, social system, modeling, breeding strategy

Packard, J.M., U.S. Seal, L.D. Mech, and E.D. Plotka. 1985. Causes of reproductive failure in two family groups of wolves. Zool. Tierpsychol. 68:24-40.

Tentatively suggest that antagonistic behavioral relationships may influence the hormonal basis for sexual attractiveness of females, copulatory behavior of males, and age of first ovulation.

KEY WORDS: behavior, physiology, population regulation, population ecology, agonistic behavior, breeding strategy

Paquet, P.C., S. Bragdon, and S. McCuster. 1982. Cooperative rearing of simultaneous litters in captive wolves. Pages 223-237 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Multiple litters occur 28-39% of the time in captive packs, and in 22-41% of wild Alaskan packs with more than one adult female. Evolutionary aspects discussed.

KEY WORDS: denning, population ecology, breeding strategy

Paquet, P.C. and L.N. Carbyn. 1986. Wolves, Canis lupus, killing denning black bears, Ursus americanus, in the Riding Mountain National Park area. Can. Field-Nat. 100(3):371-372.

Recorded three incidences of wolves digging up, killing, and consuming denning black bears.

KEY WORDS: Ursus americanus, nonprey interactions

Paradiso, J.L. and R.M. Nowak. 1982. Wolves. Pages 460-474 in J.A. Chapman and G.A. Feldhammer, eds. Wild mammals of North America. John Hopkins Univ. Press, Baltimore.

Concise overview of current biological knowledge of wolves.

KEY WORDS: general

Parker, W.T. 1986. A technical proposal to reestablish the red wolf on Alligator River National Wildlife Refuge, North Carolina. U.S. Fish and Wildl. Serv., Asheville, NC. 20pp.

Detailed plan for reintroduction procedure.

KEY WORDS: relocation, Endangered Species Act and legislation

Pederson, S. 1982. Geographic variation in Alaskan wolves. Pages 345-361 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Observed differences between subsp. C.l. pambasileus and C.l. ligoni warrant continued recognition at subspecific level. Little evidence for other previously described subspecies.

KEY WORDS: taxonomy, Alaska

Pelton, M.R. and L.C. Marcum. 1977. The potential use of radioisotopes for determining densities of black bears and other carnivores. Pages 221-236 in R.L. Phillips and C. Jonkel, eds. Proc. 1975 Predator Symp., Mont. For. Conserv. Exp. Stn., Univ. Mont., Missoula.

Several radioisotopes were evaluated as radioactive feces' tags for monitoring black bear populations. Preliminary data indicates that this method removes several of the biases inherent in conventional recapture-reobserve methods.

KEY WORDS: censusing

Peters, R. 1979. Mental maps in wolf territory. Pages 119-152 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Data suggest that wolves use cognitive maps of territory rather than response learning or confining movements to trails previously used. Shortcuts and territory infringements cited as evidence.

KEY WORDS: hunting techniques, tracking, territory, communication, activity patterns

Peters, R. 1985. Dance of the wolves. Ballantine Books, NY. 192pp.

Fictionalized account of Peter's doctoral study on scent-marking in wolves.

KEY WORDS: communication, general, behavior, tracking, general interest

Peters, R.P. and L.D. Mech. 1975. Scent-marking in wolves. Am. Sci. 63(6):628-637.

Scent-marking of territory explored. Increased marking in breeding season, increased marking along territory borders. The fresher the scent mark, the more likely it is to elicit another mark.

KEY WORDS: territory, behavior, communication

Peterson, R.L. 1947. A record of a timber wolf attacking a man. J. Mammal. 28(3):294-295.

Trainman on speeder was pulled off by lone wolf. He fended off wolf with axe for 1/2 hr until a train came and the wolf was killed by 3 men.

KEY WORDS: human interaction

Peterson, R.O. 1975. Wolf response to increased moose vulnerability on Isle Royale. Proc. North Am. Moose Conf. Workshop 11:344-368.

History to 1975 of Isle Royale moose-beaver-wolf system. Documents the sensitivity of predation to slight changes in moose vulnerability.

KEY WORDS: Alces alces, prey selection, predation, Isle Royale, Castor canadensis

Peterson, R.O. 1977. Wolf ecology and prey relationships on Isle Royale. Natl. Park Serv. Sci. Monogr. No. 11. 210pp.

Packs traveled 11 km/day with 33 km between kills. Consumed 4.4-10.0 kg moose/wolf/day. This decreased between 1971 and 1974. Synopsis of wolf-moose relationships to date on Isle Royale.

KEY WORDS: general, hunting techniques, Alces alces, denning, rendezvous site, predation, territory, population ecology, population regulation, prey selection, prey response

Peterson, R.O. 1979. The role of wolf predation in a moose population decline. Pages 329-333 in R.M. Linn, ed. Proc. 1st Conf. Sci. Res. Natl. Parks, New Orleans, 1976. U.S. Natl. Park Serv. Proc. Ser. No. 5. Vol. I.

Isle Royale. Utilized 5 kg/wolf/day. From 1971-73 when moose vulnerability increased due to nutritional stress and deep snow, they utilized 6-10 kg/wolf/day. In 1976 wolf density was 1/12 sq km. Moose declined 30-40%, considerably less than heavily hunted populations in same period.

KEY WORDS: prey biomass, Alces alces, Isle Royale, predation, surplus killing, consumption, human attitudes

Peterson, R.O. 1979. Social rejection following mating of a subordinate wolf. *J. Mammal.* 60(1):219-221.

Describes mating of alpha male with subordinate female and subsequently the subordinate female being chased by pack (including alpha male) at least twice and wounded at least once.

KEY WORDS: breeding strategy, agonistic behavior, behavior

Peterson, R.O. 1979. The wolves of Isle Royale--new developments. Pages 3-18 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Account of wolf-prey interaction. Human trails are principal travel routes in winter as evidenced by scats. Scat incidence on trails decrease by 90% in summer.

KEY WORDS: human interaction, predation, surplus killing, relocation, Isle Royale

Peterson, R.O., T.N. Bailey, and J.D. Woolington. 1983. Wolf management and harvest patterns on the Kenai National Wildlife Refuge, Alaska. Pages 96-99 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Found 39% killed 1980-81. Data suggests that harvest of over 25% of early winter populations will cause decline. Management must be integrated with habitat and prey species.

KEY WORDS: harvesting, management, Alaska

Peterson, R.O. and R.E. Page. 1983. Wolf-moose fluctuations at Isle Royale National Park, Michigan, U.S.A. *Acta Zool. Fenn.* 174:251-253.

Feel that wolves introduce additional perturbation into the eventual stability that would likely be reached by the ungulate-vegetation interaction.

KEY WORDS: predation, Alces alces, Isle Royale, prey response, modeling

Peterson, R.O., R.E. Page, and K.M. Dodge. 1984. Wolves, moose, and the allometry of population cycles. *Science* 224(4655):1350-1352.

Isle Royale. Moose-wolf cycle described. Cycle of 38(\pm 13) years predicted. This is consistent with hypothesis that herbivore population's cycle will scale with the 4th root of body mass.

KEY WORDS: population regulation, Alces alces, prey response, predation, population ecology, Isle Royale, modeling, Ursus arctos, nonprey interactions, competition

Peterson, R.O. and J.D. Woolington. 1982. The apparent extirpation and reappearance of wolves on the Kenai Peninsula, Alaska. Pages 334-344 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Traces reestablishment of wolves after human extirpation in the early 1900's. Recommendations made for reintroducing wolves.

KEY WORDS: range expansion, population ecology, Alaska, relocation, human interaction

Peterson, R.O., J.D. Woolington, and T.N. Bailey. 1984. Wolves of the Kenai Peninsula, Alaska. Wildl. Monogr. 88. 52pp.

Wolves recolonized Kenai after 50 yr absence. Density ranged from 11-20 wolves/1000 sq km. Consumed 0.12kg/kg wolf/day. Wolf density not affected until annual kill exceeded 30-40% of early winter population.

KEY WORDS: harvesting, dispersal, territory, consumption, predation, Alaska, population ecology, prey selection, general, management, range expansion

Pimlott, D.H. 1967. Wolf predation and ungulate populations. Am. Zool. 7:267-278.

Review of wolf-prey interaction to date. Suggests that adaptations between ungulates and predators may have evolved in relatively stable forest environments that could not support high-density prey populations. May explain inability of wolves to control prey in environments drastically altered by man.

KEY WORDS: predation, prey selection, consumption

Pimlott, D.H. 1975. Ecology of the wolf in North America. Pages 280-285 in M.W. Fox, ed. The wild canids. Van Nostrand Reinhold Co., NY.

Summary of knowledge of wolf ecology.

KEY WORDS: prey biomass, predation, prey selection, population ecology, territory, consumption, prey response, general

Pimlott, D.H., J.A. Shannon, and G.B. Kolenosky. 1969. The ecology of the timber wolf in Algonquin Provincial Park. Ontario Dept. Lands and Forests. 92pp.

Study from 1958-1962. Population stable. Range of 1 wolf/26 sq km. Deer main diet. Marked selectivity for deer over 5 yr in winter, fawns in summer.

KEY WORDS: population ecology, predation, prey selection, territory, dispersal, population regulation, Canada, Ontario, Odocoileus virginianus

Powell, C.B. and R.A. Powell. 1982. The predator-prey concept in elementary education. *Wildl. Soc. Bull.* 10:238-244.

Questionnaires show teachers and children are ready to teach and learn predator-prey concepts. Many teachers lack knowledge of how to do it.

KEY WORDS: general interest, predation

Pulliainen, E. 1975. Wolf ecology in northern Europe. Pages 292-299 in M.W. Fox, ed. *The wild canids*. Van Nostrand Reinhold Co., NY.

In southern and western Finland, wolves have used same migration routes for decades. Wild prey more completely utilized than livestock. Average number of pups 3.8 in captive animals, 2.8 in wild. High average age of population and inbreeding hypothesized for low fecundity.

KEY WORDS: general, Europe

Pulliainen, E. 1979. Ecology of the wolf in the settled areas of Finland. Pages 84-92 in E. Klinghammer, ed. *The behavior and ecology of wolves*. Garland STPM Press, NY.

Immigration occurring from the Union of Soviet Socialist Republics. No breeding in Finland has been confirmed. Domestic animals, moose, introduced white-tailed deer, and small prey all consumed.

KEY WORDS: range expansion, Europe, human interaction, depredation, human attitudes, predation, history

Pulliainen, E. 1980. The status, structure and behavior of populations of wolf along the Fenno-Soviet border. *Ann Zool. Fennici* 17:107-112.

Since 1950 there have been 2 expansions of wolves into Finland. At beginning of each expansion most were male. Control in the Union of Soviet Socialist Republics disturbs self-regulation and allows maximum reproduction.

KEY WORDS: range expansion, distribution, Europe, Union of Soviet Socialist Republics, dispersal

Pulliainen, E. 1982. Behavior and structure of an expanding wolf population in Karelia, northern Europe. Pages 134-145 in F.H. Harrington and P.C. Paquet, eds. *Wolves of the world*. Noyes Publ., Park Ridge, NJ.

Reviews behavior and structure of wolf populations of Soviet Karelia and adjacent Finnish territory from late 1940's to 1970's. Wolves increased in Soviet Karelia twice due to increases in prey base. Wolf habitat saturated at 5-7 wolves/1000 sq km. Wolves then dispersed into Finnish territory, males being the first to enter Finland.

KEY WORDS: behavior, dispersal, range expansion, Europe, Union of Soviet Socialist Republics

Pulliainen, E. 1985. The expansion mechanism of the wolf in northern Europe. *La Terre et la Vie*. 40(2):57-62.

All wolf tracks crossing border noted by Finnish border patrol. An increase in the crossings is attributed to an increase in the number of wolves in Soviet Karelia. Population decreased with 20% harvest rate.

KEY WORDS: harvesting, population ecology, management, Europe, Union of Soviet Socialist Republics

Quimby, D.C. and J.E. Gaab. 1957. Mandibular dentition as an age indicator in Rocky Mountain elk. *J. Wildl. Manage.* 21(4):435-451.

Sequence of tooth eruption and wear of elk teeth. Black and white photos.

KEY WORDS: kill analysis

Ramsay, M.A. and I. Stirling. 1984. Interactions of wolves and polar bears in northern Manitoba. *J. Mammal.* 65(4):693-694.

Evidence suggests that wolves may learn to separate mother polar bears from cubs and then prey on cubs.

KEY WORDS: nonprey interactions, Ursus maritimus

Randall, D. 1980. Wolves for Yellowstone. *Defenders* 55(3):188-190.

General interest article encouraging wolf reintroduction in Yellowstone and reasons for doing this.

KEY WORDS: Yellowstone, human attitudes, relocation, general interest

Rausch, R. 1958. Some observations on rabies in Alaska, with special reference to wild canidae. *J. Wildl. Manage.* 22(3):246-260.

Rabies recorded in wolves only at times of high population density.

KEY WORDS: parasites and disease, Alaska

Rausch, R.A. 1965. Furbearer report. Alaska Dept. Fish and Game, Juneau. Projs. W-6-R-5, W-6-R-6, Work Plan J, Job No. 1,2,3,4,5. Vol. VI. 15pp.

Alaska. Jan 1964-Dec 1964. Most of 713 wolves presented for bounty taken by trappers. Deep snow hindered aerial hunting. Pups comprised 65% of arctic region harvest and 39% of interior region. Most females reproduce at 2 yrs. Average 6 pups/litter.

KEY WORDS: harvesting, population ecology, management, Alaska

Rausch, R.A. 1966. Furbearer studies. Wolf and wolverine. Wolf studies. Alaska Dept. Fish and Game, Juneau. Proj. W-6-5-7, Work Plan J, Jobs 1 and 2. 43pp.

Alaska. Jan 1964-June 1966. Examined 1,262 wolf carcasses. Pregnant adult females averaged 6.5 fetuses, pregnant 2-year-olds averaged 5.3. Mortality begins in utero. Pack size is indicator of abundance. Protected wolves increased at an average rate of 20-30%/year during 11-year period.

KEY WORDS: population ecology, physiology, Alaska

Rausch, R.A. 1968. Wolf studies. Alaska Dept. Fish and Game, Juneau. Proj. W-15-R-2, Job 1, and Proj. W-15-R-3, Jobs 1 and 3, Work Plan O. Vol. IX. 51pp.

Alaska. July 1966-Dec 1967. In 1967, 1,850 wolves presented for bounty. Ideal conditions for aerial hunting. The Nelchina Basin study of wolves, inaugurated in 1957, is evaluated. During 10 years when wolves were protected, there were no detectable reductions in big game solely to wolves.

KEY WORDS: management, population ecology, Alces alces, Rangifer tarandus, Ovis dalli, human attitudes, Alaska, predation, territory

Rausch, R.A. 1969. Statewide wolf population studies. Alaska Dept. Fish and Game, Juneau. Proj. W-17-1, Work Plan O, Job No. 1. Vol X. 19pp.

Alaska, southeast and arctic. Study from July 1968-June 1969. Presented 1,714 wolves for bounty. Increased kill except for Unit 20 which is probably over-exploited. Fecundity of arctic wolves increased due to population expansion and exploitation.

KEY WORDS: management, Alaska, territory, range expansion

Rausch, R.A. 1969. Wolf summer food habits and den studies. Alaska Dept. Fish and Game, Juneau. Proj. W-17-1, Work Plan O, Job No. 3, July 1, 1968, to June 30, 1969. 15pp.

Alaska. Located 13 dens, 3 active. Moose calves and caribou principal summer foods.

KEY WORDS: predation, denning, Alaska, scat analysis, small prey, Alces alces, Rangifer tarandus, territory

Rausch, R.A. and R.A. Hinman. 1977. Wolf management in Alaska--an exercise in futility. Pages 147-156 in R.L. Phillips and C. Jonkel, eds. Proc. 1975 Predator Symp., Mont. For. Conserv. Exp. Stn., Univ. Mont., Missoula.

Historical account of wolf management. Highly critical of protectionist groups. Feels they are using the wolf as symbol and are actually endangering the animal.

KEY WORDS: predation, human attitudes, management, Alaska, history

Rausch, R.A. and R.L. Winters. 1964. Alaska wildlife investigations. Wolf management investigations. Alaska Dept. Fish and Game, Juneau. Proj. W-6-R-4, Work Plan K, Job No. 2. Vol. IV. 13pp.

Nelchina Basin, Alaska. Minimum population of 79 animals from Sept 1962-March 1963. Population likely increasing. Junction between epiphysis and diaphysis of ulna and radius is useful in separating wolves of the year from older. Weight of os penis useful in separating young males from adult males. Dried weight of lenses not a satisfactory criteria for aging.

KEY WORDS: physiology, Alaska, territory

Raymer, J., D. Wiesler, M. Novotny, C. Asa, and U.S. Seal. 1984. Volatile constituents of wolf Canis lupus urine related to gender and season. Experientia 40:707-709.

Constituents clearly associated with gender, and many displayed seasonal dependence.

KEY WORDS: physiology, communication

Raymer, J., D. Wiesler, M. Novotny, C. Asa, U.S. Seal, and L.D. Mech. 1985. Chemical investigations of wolf Canis lupus anal-sac secretion in relation to breeding season. J. Chem. Ecol. 2(5):593-607.

Some compounds in anal-sac secretions are significantly different. Implies that they may be used to communicate gender and breeding state.

KEY WORDS: physiology, communication

Ream, R. 1982. Room to roam. West. Wildlands 8(2):22-26.

Deals with issues involved in reintroducing wolves. Gives reintroduction parameters. Argues that natural recovery, though not as flashy, is better where it is possible.

KEY WORDS: human attitudes, range expansion, relocation, Montana, Endangered Species Act and legislation, general interest

Ream, R. 1984. The wolf is at our door: population recovery in the northern Rockies. West. Wildlands 10(2):2-7.

History of wolf ecology project and documentation of wolf recovery.

KEY WORDS: distribution, Montana, history, depredation, general interest

Ream, R. and R. Harris. 1986. Wolf movements in southern Alberta. Nat. Geog. Soc. Res. Rep. 21:405-409.

Surveyed wolf activity in area 50 miles north of U.S.-Canada border on east front. Found low density of wolves, probably due to human-caused mortality.

KEY WORDS: range expansion, Endangered Species Act and legislation, depredation, Montana, Canada, Alberta

Ream, R., R. Harris, J. Smith, and D. Boyd. 1985. Movement patterns of a lone wolf, Canis lupus, in unoccupied wolf range, southeastern British Columbia. Can. Field-Nat. 99:234-239.

Wolf travelled less in winter. Strong preference for valley bottoms. Movement patterns more distinct and predictable than those of lone wolves living among resident packs.

KEY WORDS: range expansion, Montana, Canada, British Columbia, single wolves, territory

Ream, R.R., M.W. Fairchild, and D. Boyd. 1986. Wolf ecology project progress report, July 1985 through June 1986. Univ. Mont., Missoula. 26pp.

White-tailed deer, mule deer, and elk appeared in that order in scat analysis. Denbed in Glacier National Park, 5 pups weaned. Currently 4 wolves are radiocollared.

KEY WORDS: distribution, Montana, Odocoileus virginianus, Cervus elaphus, Alces alces, scat analysis, single wolves, predation, Odocoileus hemionus

Ream, R.R. and U. Mattson. 1979. Wolf identification: a field guide. Wolf Ecol. Proj., Wilderness Inst., Mont. For. Conserv. Exp. Stn., Univ. Mont., Missoula. Spec. Pub. No. 1. 9pp.

Compares dog, wolf, coyote tracks. Describes wolf identification in field: 80-100 lbs., all shades of gray and brown including white and black, tail held straight or down. Report form included.

KEY WORDS: general

Ream, R.R. and U.I. Mattson. 1982. Wolf status in the northern Rockies. Pages 362-381 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

History and current status of wolf populations in Rockies. Reports from many areas but not consistently one place year after year. Probably the population consists primarily of nonbreeding dispersers.

KEY WORDS: history, Montana, Endangered Species Act and legislation, distribution, range expansion, Idaho, Wyoming

Ream, R.R. and R.R. Rogers. 1979. A winter wolf survey in the vicinity of the Anaconda range. Wolf Ecol. Proj., Wilderness Inst., Mont. For. Conserv. Exp. Stn. Univ. Mont., Missoula. 17pp.

Unlikely to be a resident wolf population in the Anaconda range, Montana.

KEY WORDS: distribution, Montana, history

Rearden, J. 1980. A tug-of-war with facts and feelings. Alaska 46(5):30.

Discusses wolf management in Alaska. Identifies seven issues people must believe before they will accept wolf control.

KEY WORDS: Alaska, general interest, human attitudes

Robbins, J. 1986. Wolves across the border. Nat. Hist. 5:22-26.

Describes current status of wolves in Glacier National Park. Discusses public concerns, and possible future problems.

KEY WORDS: Montana, general interest

Robel, R.J., A.D. Dayton, F.R. Henderson, R.L. Meduna, and C.W. Spaeth. 1981. Relationships between husbandry methods and sheep losses to canine predators. J. Wildl. Manage. 45(4):894-911.

Annual loss to predators <1%. Found 80% of predator-caused deaths were in 22% of the producers. Husbandry techniques suggested.

KEY WORDS: depredation, sheep, Kansas

Rogers, L.L. and L.D. Mech. 1981. Interactions of wolves and black bears in northeastern Minnesota. J. Mammal. 62(2):434-436.

Describes 5 bear-wolf interactions. In one a wolf pack killed and ate denning bear and her 2 newborn cubs. Lone wolves flee from bears. No bear scats contain wolf. Few wolf scats contain bear.

KEY WORDS: Ursus americanus, Minnesota, nonprey interactions, competition

Rogers, L.L., L.D. Mech, K.K. Dawson, J.M. Peek, and M. Korb. 1980. Deer distribution in relation to wolf pack territory edges. J. Wildl. Manage. 44(1):253-258.

Track and trail counts used to demonstrate deer are more prevalent at territory edges in declining deer populations. No habitat differences noted between centers and edges.

KEY WORDS: prey response, predation, territory, Odocoileus virginianus

Rothman, R.J. and L.D. Mech. 1979. Scent-marking in lone wolves and newly formed pairs. *Anim. Behav.* 27(3):750-760.

Lone wolves rarely mark. They defecate and urinate less along roads and trails. Newly formed pairs marked the most. Scent marking important in success of courtship as well as for territory establishment. Nonbreeding wolves seldom mark.

KEY WORDS: communication, territory, behavior, breeding strategy, single wolves

Roughton, R.D. and M.W. Sweeny. 1982. Refinements in scent-station methodology for assessing trends in carnivore populations. *J. Wildl. Manage.* 46(1):217-229.

Suggests refinements: 1) use of plaster disk saturated with attractant, 2) lines of 10 scent stations operated for 1 night, and 3) computer analysis of data by a program incorporating the Fisher Randomization Test and Wilcoxon Signed Rank Test.

KEY WORDS: censusing

Rowan, W. 1950. Winter habits and numbers of timber wolves. *J. Mammal.* 31(2):167-169.

Due to complaints about a huge increase in the wolf population the reports of trappers were collected on wolves seen, tracks seen, and direction and date. Mapped information showed population of 7 wolves.

KEY WORDS: censusing

Roy, L.D. and M.J. Dorrance. 1976. Methods of investigating predation of domestic livestock. Alberta Agric. Plant Industry Lab., Edmonton. 54pp.

Details clues for identifying predator kills and type of predator. Color photos.

KEY WORDS: depredation, sheep, cattle, kill analysis

Rutter, R.J. and D.H. Pimlott. 1968. The world of the wolf. J.P. Lippincott Co., Philadelphia. 202pp.

Describes behavior and ecology of wolves. Discusses historical attitudes and speculates on the wolf's future.

KEY WORDS: general, general interest, human attitudes

Ryon, C.J. 1977. Den digging and related behavior in a captive timber wolf pack. *J. Mammal.* 58(1):87-89.

Captive wolves: 12 yr male, 6 yr female, and 2 yearling females. Construction of den detailed: digging behavior, moving litter between den sites, feeding of mother and pups.

KEY WORDS: denning, behavior

Samuel, W.M., S. Ramalingam, and L.N. Carbyn. 1978. A gray wolf (Canis lupus columbianus) and stone sheep (Ovis dalli stonei) fatal predator-prey encounter. Can. Field-Nat. 92(4):399-401.

Lone wolf chased ewe and lamb downslope until they fell to death. Wolf fell and died apparently trying to reach them. Surprise and downhill chase most effective techniques for killing sheep.

KEY WORDS: Ovis dalli, hunting techniques, injuries and accidents, predation

Schaefer, J.M., R.D. Andrews, and J.J. Dinsmore. 1981. An assessment of coyote and dog predation on sheep in southern Iowa. J. Wildl. Manage. 45(4):883-893.

Questionnaire, post card survey, field necropsies, and domestic-animal claims used to assess dog and coyote predation on sheep. Dogs killed more than coyotes. Sheep operators correctly assessed predation losses 94% of the time.

KEY WORDS: depredation, sheep, Iowa

Schneider, B. 1980. Is there room for the wolf? Outdoor Life 165(8):50.

There is physical room for wolves in many areas of North America but humans will not allow it.

KEY WORDS: general interest, range expansion, human attitudes

Scott, B. and D.M. Shackleton. 1982. A preliminary study of the social organization of the Vancouver Island wolf. Pages 12-25 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Home ranges 64-75 sq km. Size fluctuates and probable that they may become larger. Wolves more active at night.

KEY WORDS: territory, activity patterns

Scott, B.M.V. and D.M. Shackleton. 1980. Food habits of two Vancouver Island wolf packs. Can. J. Zool. 58(6):1203-1207.

Scat analysis of 2 packs. Black-tailed deer most common overall, then elk, then beaver. Elk most common in July and August. Predominantly calves and fawns in summer. Scats at homesites and dens differed from others.

KEY WORDS: prey selection, predation, Odocoileus hemionus, Cervus elaphus, Castor canadensis, rendezvous site, Canada, British Columbia, scat analysis

Scott, P.A., C.V. Bentley, and J.J. Warren. 1985. Aggressive behavior by wolves toward humans. *J. Mammal.* 66(4):807-809.

Describes encounter between 3 wolves and 3 humans in Canada. No warning, no injuries, "victims" climbed trees. Possibly at a rendezvous site. References to other encounters.

KEY WORDS: human interaction, Canada, rendezvous site

Seal, U.S. and A.W. Erickson. Phencyclidine hydrochloride immobilization of the carnivora and other mammals. Unpubl.

Details of dosage requirements, time for immobilization, recovery, and side effects.

KEY WORDS: capture

Seal, U.S. and L.D. Mech. 1983. Blood indicators of seasonal metabolic patterns in captive adult gray wolves. *J. Wildl. Manage.* 47(3):704-715.

Hemoglobin, hematocrit, RBCs, MCHC, and thyroxine exhibited consistent circa-annual patterns of variation in both males and females.

KEY WORDS: physiology

Seal, U.S., L.D. Mech, and V. Van Ballenberghe. 1975. Blood analyses of wolf pups and their ecological and metabolic interpretation. *J. Mammal.* 56(1):64-75.

Analyzed 32 wolf pups' blood and compared it to dogs. Wolf pups not growing to potential. Increased abnormal blood chemistries in 1972 correlated to poor nutrition and decreased survival.

KEY WORDS: physiology, population regulation, Minnesota

Seal, U.S., E.D. Plotka, J.M. Packard, and L.D. Mech. 1979. Endocrine correlates of reproduction in the wolf. I. Serum progesterone, estradiol, and LH during the estrous cycle. *Biol. Reproduction* 21:1057-1066.

See title.

KEY WORDS: physiology

Severinghaus, C.W. 1949. Tooth development and wear as criteria of age in white-tailed deer. *J. Wildl. Manage.* 13(2):195-216.

Sequence of tooth eruption and wear of white-tailed deer. Black and white photos.

KEY WORDS: kill analysis

Shahi, S.P. 1983. Status of grey wolf (Canis lupus pallipes Sykes) in India. Acta Zool. Fenn. 174:283-286.

Recognized as endangered species. Little known about it. Documented killing of human children.

KEY WORDS: Asia, human interaction, management

Sharp, H.S. 1982. Some problems in wolf sociology. Pages 423-433 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Questions orthodox view of wolf packs as breeding units. Attempts to analyze them from view of a social scientist.

KEY WORDS: single wolves, behavior, social system

Shelton, P.C. and R.O. Peterson. 1983. Beaver, wolf, and moose interactions in Isle Royale National Park, U.S.A. Acta Zool. Fenn. 174:265-266.

Competition with moose for food, declining food resources, and continued wolf predation may prevent the beaver population from reaching previously high numbers.

KEY WORDS: Castor canadensis, Alces alces, predation, population ecology, Isle Royale

Shields, W.M. 1983. Genetic considerations in the management of the wolf and other large vertebrates: an alternative view. Pages 90-92 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Wolf megapopulations should be maintained at high numbers. Gene flow between neighboring demes should be maintained or provided. Overwide outbreeding should not be generated during the stocking of new populations.

KEY WORDS: management, relocation, genetics

Singer, F.J. 1979. Status and history of timber wolves in Glacier National Park, Montana. Pages 19-42 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

At least 3 packs present in Glacier National Park in 1910. Greatly reduced by poisoning and trapping in 1920's. Increased in 1948-56 and again reduced to present minimal levels.

KEY WORDS: distribution, history, Montana

Skoog, R.O. 1983. Results of Alaska's attempts to increase prey by controlling wolves. *Acta Zool. Fenn.* 174:245-247.

Review of wolf control program near Fairbanks. Wolves reduced 65%. Survival of calves and yearlings increased 2-4 times. When prey population enters significant decline due to hunting or weather, the manager can: 1) wait for slow, more or less natural, change of events, or 2) hasten increase in prey by altering the control which predators exert on prey populations.

KEY WORDS: prey biomass, predation, management, Alces alces, Rangifer tarandus, prey response, Alaska

Smith, B.L. 1983. The status and management of the wolf in the Yukon Territory. Pages 48-50 in L.N. Carbyn, ed. *Wolves in Canada and Alaska*. Can. Wildl. Serv. Rep. Ser. 45.

No wolf control to benefit ungulate populations is in effect. Classified as "big game." No compensation for livestock owners. Wolf management currently receiving little attention.

KEY WORDS: management, Canada, Yukon, history, population ecology

Smith, T.G. 1980. Hunting, kill, and utilization of a caribou by a single gray wolf. *Can. Field-Nat.* 94(2):175-177.

Lone wolf seen killing caribou on sea ice in Canada. Totally consumed 42 kg. Crude extrapolations show one wolf might consume 28 caribou/year.

KEY WORDS: Rangifer tarandus, predation, Canada, consumption, hunting techniques

Sorensen, O.J., I. Mysterud, and T. Kvam. 1984. Central registration of large carnivores in Norway. *Acta. Zool. Fenn.* 172:213-214.

Procedures for collecting, organizing, storing, and evaluating information on a computer system are presented.

KEY WORDS: Europe, censusing, management

Stardom, R.R.P. 1983. Status and management of wolves in Manitoba. Pages 30-34 in L.N. Carbyn. *Wolves in Canada and Alaska*. Can. Wildl. Serv. Rep. Ser. 45.

No control programs being carried out to increase ungulates. Has "big game" status. May be taken anytime for property defense. Estimate 4,000 wolves. Annual harvest of 400 plus unknown numbers in control actions.

KEY WORDS: management, Canada, Manitoba, history, population ecology

Stenlund, M.H. 1955. A field study of the timber wolf (Canis lupus) on the Superior National Forest, Minnesota. Minn. Div. Fish and Game, Proj. No. Minn. W-011-R. Minn. Dept. Cons. Bull. 4. 55pp.

Status and field study of wolves in vicinity of Ely, Minnesota, region prior to Mech's studies.

KEY WORDS: predation, Odocoileus virginianus, denning, population ecology, population regulation, physiology, Castor canadensis, general, Minnesota

Stephens, P.W. and R.O. Peterson. 1984. Wolf-avoidance strategies of moose. Holarc. Ecol. 7(2):239-244.

Suggests 2 antipredator strategies by moose, especially cows and calves. Increased density near open water and people in summer, near coniferous cover in winter.

KEY WORDS: predation, Alces alces, Isle Royale, prey response

Stephenson, R. and B. Ahgook. 1975. The Eskimo hunter's view of wolf ecology and behavior. Pages 286-291 in M.W. Fox, ed. The wild canids. Van Nostrand Reinhold Co., NY.

Eskimos interpret wolf behavior on a much more individual basis than western science. A wolf can kill just about any animal it chooses to but usually chooses weaker ones. Different animals react differently to intrusion at den sites.

KEY WORDS: human attitudes, human interaction

Stephenson, R.O. 1974. Characteristics of wolf den sites. Alaska Board Fish and Game, Proj. No. Alaska W-017-R-06/Work Place 14/Job 06/Final.

Dens usually situated on moderately steep southerly slopes, well drained soil, near source of water. Four cases of surface denning documented. Den configuration, potential effects of human disturbance thoroughly discussed.

KEY WORDS: denning, Alaska, human interaction, rendezvous site

Stephenson, R.O. 1975. Wolf report. Alaska Dept. Fish and Game, Juneau. Proj. W-17-6, Jobs 14.3R, 14.4R, 14.5R, 14.6R (2nd half), and Proj. W-17-7, Jobs 14.3R, 14.4R, 14.5R (1st half). Vol. XIII. 11pp.

Arctic and southcentral Alaska. January 1974-December 1974. Small prey formed significant portion of summer food.

KEY WORDS: small prey, population ecology, territory, Alces alces, Rangifer tarandus, Alaska, denning, scat analysis

Stephenson, R.O. 1982. Nunamiut Eskimos, wildlife biologists, and wolves. Pages 434-440 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Compares formally trained biologist's view of wolves with field trained Eskimo's. Eskimos much more able to allow for individual differences due to personality traits.

KEY WORDS: human attitudes

Stephenson, R.O. and D. James. 1982. Wolf movements and food habits in northwest Alaska. Pages 26-42 in F.H. Harrington and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Wolves that are highly dependent on migratory caribou make extensive moves from summer to winter ranges. Appears they are repeating traditional movement patterns rather than randomly searching for prey.

KEY WORDS: territory, activity patterns, Rangifer tarandus, Alaska

Stephenson, R.O. and L. Johnson. 1972. Wolf report. Alaska Dept. Fish and Game, Juneau. Proj W-17-3, Jobs 14.3R, 14.4R, 14.5R, 14.6R. Vol. X. 52pp.

Summer food habits, den site physiography and vegetation, den occupancy, litter size, population trends, and immobilization study in North Central Brooks Range and the Nelchina Basin.

KEY WORDS: capture, prey selection, predation, denning, population ecology, management, Rangifer tarandus, Ovis dalli, small prey, Alaska, territory

Stephenson, R.O. and L.J. Johnson. 1973. Wolf report. Alaska Dept. Fish and Game, Juneau. Projs. W-17-4, W-17-5, Jobs 14.3R, 14.4R, 14.5R, 14.6R, 14.7R. Vol. XI. 52pp.

Arctic and southcentral Alaska. July 1971-December 1972. Results indicate that in severe winters there is no selection for prey based on age, sex, or condition. Mean litter size 5.3. Characteristics for diagnosing sex in field enumerated.

KEY WORDS: hunting techniques, relocation, predation, territory, physiology, human interaction, management, Alces alces, Alaska, denning, prey selection, population ecology, Rangifer tarandus

Stephenson, R.O. and J.J. Sexton. 1974. Wolf report. Alaska Dept. Fish and Game, Juneau. Proj. W-17-5, Jobs 14.3R, 14.4R, 14.5R, 14.6R, 14.7R (2nd half), and Proj. W-17-6, Jobs 14.3R, 14.4R, 14.5R, 14.6R (1st. half). Vol. XII. 28pp.

Arctic and southcentral Alaska. January 1973-December 1973. Few wolf-killed ungulates found due to light winter. Sectioned 20 teeth (6 known age). A "non-transparent" cementum layer is formed each winter.

KEY WORDS: physiology, denning, management, Alces alces, Alaska, territory

Stocker, M. 1981. Optimization model for a wolf-ungulate system. *Ecol. Modeling* 12(3):151-172.

Cost (managerial and environmental) of predator control must be balanced against benefit of ungulate harvesting. Stability properties depend on predator search efficiency. Optimal wolf control strategies completely insensitive to moose density.

KEY WORDS: modeling, predation, population ecology, prey response, management

Strickland, D. 1983. Wolf howling in parks--the Algonquin experience in interpretation. Pages 93-95 in L.N. Carbyn, ed. *Wolves in Canada and Alaska*. Can. Wildl. Serv. Rep. 45.

History of use of "wolf howling" as means of locating wolves for research purposes. Describes use of technique for interpretation with attention to logistics of leading large numbers of people to hear wolves.

KEY WORDS: human attitudes, human interaction, management, communication, Canada, Ontario

Sullivan, J.O. 1979. Individual variability in hunting behavior of wolves. Pages 284-306 in E. Klinghammer, ed. *The behavior and ecology of wolves*. Garland STPM Press, NY.

Wolf behavior toward rabbits released in their cages observed. Great variety in time spent hunting and behavior during hunt.

KEY WORDS: behavior, hunting techniques

Swanberg, C. 1975. A case study for species reintroduction: the wolf in Olympic National Park, Washington. *Evergreen State Coll., Olympia*. 82pp.

Feasibility study of wolf reintroduction. Results: feasible to monitor prey populations. Computer simulation shows 40-60 wolves could exist in dynamic equilibrium with present prey.

KEY WORDS: relocation, modeling, Washington, Endangered Species Act and legislation

Telfer, E.S. and J.P. Kelsall. 1984. Adaptation of some large North American mammals for survival in snow. *Ecology* 65(6):1828-1834.

Chest height, foot loading, and behavior assessed for a variety of ungulates and large predators. Predation appears to have been a factor influencing evolution of ungulate behavior in snow.

KEY WORDS: predation, prey selection, prey response

Theberge, J.B. 1975. Wolves and wilderness. J.M. Dent and Sons, Toronto. 159pp.

Describes author's studies of wolves. Discusses wolves' relationship to wilderness and man.

KEY WORDS: general interest, general

Theberge, J.B. 1979. The man, the wolf, and the ethic. Ontario Nat. 18(5):4-9.

Theberge remembers Pimlott and his efforts to change attitudes toward wolves and the management of wolves.

KEY WORDS: human attitudes, history, general interest, Canada

Theberge, J.B. 1983. Considerations in wolf management related to genetic variability and adaptive change. Pages 86-89 in L. N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Adaptive change through genetic isolation may be too slow in K-selected wolves to keep up with environmental change. Should aim at keeping some gene flow through local demes. Minimum population size discussed.

KEY WORDS: management, genetics

Theberge, J.B. and T.J. Cottrell. 1977. Food habits of wolves in Kluane National Park. Arctic. 30(3):189-191.

Scat analysis at 2 different den sites showed moose to be about 50% of diet. Small mammals accounted for about 35.7%. The 2 dens were very different in types of small mammals.

KEY WORDS: denning, predation, scat analysis, small prey, prey selection

Theberge, J.B. and J.B. Falls. 1967. Howling as a means of communication in timber wolves. Am. Zool. 7(2):331-338.

Suggests howling identifies the species, functions in location of specific animal, and provides specific information about the howling animal.

KEY WORDS: communication

Theberge, J.B. and D.A. Gauthier. 1985. Models of wolf-ungulate relationships: when is wolf control justified? Wildl. Soc. Bull. 13(4):449-458.

Provides set of models and flow chart to answer the question: will wolf control increase prey numbers? Control justified in only 2 out of 7 scenarios. Multiple predator-prey interactions addressed.

KEY WORDS: management, predation, prey response, prey selection, modeling

Theberge, J.B., S.M. Oosenbrug, and D.H. Pimlott. 1978. Site and seasonal variations in food of wolves, Algonquin Park, Ontario. *Can. Field-Nat.* 92(1):91-94.

Scats collected show higher percentage of beavers near rendezvous site (sites all near active beaver colonies). White-tailed deer more common away from rendezvous sites.

KEY WORDS: predation, Odocoileus virginianus, Castor canadensis, scat analysis, Canada, Ontario, rendezvous site, prey selection

Theberge, J.B. and D.H. Pimlott. 1969. Observations of wolves at a rendezvous site in Algonquin Park. *Can. Field-Nat.* 83(2):122-128.

Sites on borders between coniferous forest and an open and at least partially wet area. Response rate was 60% to prerecorded wolf howls, 38% to human howls.

KEY WORDS: behavior, rendezvous site, activity patterns, Canada, Ontario, communication, consumption, Odocoileus virginianus

Theberge, J.B. and D.R. Strickland. 1978. Changes in wolf numbers, Algonquin Provincial Park, Ontario. *Can. Field-Nat.* 92(4):395-398.

Numbers censused from 1958-1975. In beginning, 13-14 packs. Heavily trapped in 1964. Recovered by 1971. White-tailed deer exhibited great decline through period. Wolves switched to moose and beaver.

KEY WORDS: population ecology, population regulation, management, prey selection, predation, Canada, Ontario, Alces alces, Odocoileus virginianus, Castor canadensis

Thiel, R.P. 1978. The status of the timber wolf in Wisconsin--1975. *Trans. Wisc. Acad. Sci., Arts, Letters* 66:186-194.

Wolves are primarily ones dispersing from Minnesota. Human activity probably too great to support pack activity. Deer hunters and trappers are greatest threat. Recommendations to reverse deteriorating condition.

KEY WORDS: history, distribution, Endangered Species Act and legislation, censusing, human interaction, Wisconsin

Thiel, R.P. 1985. Relationship between road densities and wolf habitat suitability in Wisconsin. *Am. Midl. Nat.* 113(2):404-407.

Data on demise of wolf and increase in road densities compared between 1926 and 1960. Wolves failed to survive when road densities exceeded 0.93 miles/sq mi.

KEY WORDS: human interaction, Wisconsin, relocation

Thiel, R.P. and S.H. Fritts. 1983. Chewing-removal of radiocollars by gray wolves in Wisconsin. *J. Wildl. Manage.* 47(3):851-852.

Found 7 of 11 collars on 2 different packs were chewed off in 8 simultaneous months. Appears to be a learned behavior in these packs. Rarely reported in literature.

KEY WORDS: capture, behavior

Thiel, R.P. and J.B. Hale. 1980. Endangered and threatened species investigations. Status of the timber wolf. Wisc. Dept. Nat. Resour., Madison. Proj. E-1-4, Study 101, Jobs 1 and 2. 8pp.

Surveys of pioneering wolves done by track counts and howling trials. Identified 5 packs. Radiocollared 8 wolves.

KEY WORDS: censusing, Endangered Species Act and legislation, communication, tracking, Wisconsin

Thiel, R.P. and R.J. Welch. 1981. Evidence of recent breeding activity in Wisconsin wolves. *Am. Midl. Nat.* 106(2):401-402.

Wolves extirpated by 1960. Tracking study in 1977-79 revealed evidence of female in heat and pup tracks within 2 pack territories.

KEY WORDS: range expansion, Wisconsin

Thompson, D.Q. 1952. Travel, range, and food habits of timber wolves in Wisconsin. *J. Mammal.* 33(4):429-442.

Census data indicated that deer densities in wolf range and on nearby wolf-free range increased similarly. Management to ensure continued existence of wolf discussed.

KEY WORDS: predation, Odocoileus virginianus, territory, scat analysis, prey selection, small prey, Castor canadensis, management, Wisconsin

Tigner, J.R. and G.E. Larson. 1977. Sheep losses on selected ranches in southern Wyoming. *J. Range Manage.* 30(4):244-252.

Monitored 6,000 ewes and their lambs for 2 years. Of 4,440 dead sheep examined, predators killed 23%. Of the predation, coyotes accounted for 77%, black bears 11%, and golden eagles 9%.

KEY WORDS: depredation, sheep

Timm, R.M. and G.E. Connolly. 1977. How coyotes kill sheep. *Rangeman's J.* 4(4):106-107.

Coyotes usually attacked by running alongside fleeing sheep and biting them behind and below the ear. Usually feed on viscera and rump first.

KEY WORDS: depredation, sheep, kill analysis

Tobey, R.W. and W.B. Ballard. 1985. Increased mortality in gray wolves captured with acepromazine and etorphine hydrochloride in combination. J. Wildl. Diseases 21(2):188-190.

Suggests that etorphine hydrochloride (EH) in combination with acepromazine (AP) should not be used for capturing wolves from a helicopter during periods of high ambient air temperatures.

KEY WORDS: capture, injuries and accidents

Todd, A.W., J.R. Gunson, and W.M. Samuel. 1981. Sarcoptic mange: an important disease of coyotes and wolves of Alberta, Canada. Pages 706-729 in J.A. Chapman and D. Pursley, eds. Proc. Worldwide Furbearer Conf., Aug 3-11, 1980, Frostburg, MD.

Recruitment in wolves reduced during mange outbreak. Appears to be density-dependent.

KEY WORDS: parasites and disease, population ecology, Canada, Alberta, population regulation

Tompa, F.S. 1983. Problem wolf management in British Columbia: conflict and problem evaluation. Pages 112-119 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Most livestock killed in summer/fall. Many harassment complaints occur in winter. Control most effective when aimed at problem wolves. Estimate 5% of population are problems.

KEY WORDS: management, depredation, human interaction, cattle, sheep, other domestic animals, Canada, British Columbia

Tompa, F.S. 1983. Status and management of wolves in British Columbia. Pages 20-24 in L.N. Carbyn, ed. Wolves in Canada and Alaska. Can. Wildl. Serv. Rep. Ser. 45.

Currently has big game status. Completely protected in national parks. Control aimed only at problem wolves. Estimate population of 6,300. Annual harvest of 200-450 plus 50-200 by control.

KEY WORDS: Canada, British Columbia, management, history, population ecology

U.S. Fish and Wildlife Service. 1978. Recovery plan for the eastern timber wolf. Prepared by the Eastern Timber Wolf Recovery Team. U.S. Fish and Wildl. Serv., Marquette, MI. 79pp.

See title.

KEY WORDS: Endangered Species Act and legislation, depredation, management, relocation, Minnesota

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. U.S. Fish and Wildl. Serv., Denver, CO. 119pp.

Proposal and outline of steps necessary for reestablishment and maintenance of viable populations in portions of its former range where feasible (3 areas).

KEY WORDS: history, Montana, Idaho, Yellowstone, Endangered Species Act and legislation

Van Ballenberghe, V. 1972. Ecology, movements, and population characteristics of timber wolves in northeastern Minnesota. Ph.D. Thesis. Univ. Minn., Minneapolis. 106pp.

Found 44% survival rate from birth to 6 months. Minimum annual mortality 20%. Found 73% of observed mortality human-caused. Range of 9.1 sq mi/wolf.

KEY WORDS: management, population ecology, population regulation, territory, rendezvous site, denning, activity patterns, general, capture, Minnesota

Van Ballenberghe, V. 1974. Wolf management in Minnesota: an endangered species case history. Trans. North Am. Wildl. and Nat. Resour. Conf. 39:313-322.

History of Minnesota wolves up to 1974. Political and sociological problems noted. Recommends not having total protection.

KEY WORDS: history, Endangered Species Act and legislation, human attitudes, Minnesota

Van Ballenberghe, V. 1977. Physical characteristics of timber wolves in Minnesota. Pages 213-220 in R. L. Phillips and C. Jonkel, eds. Proceedings of 1975 Predator Symposium in Montana. For. Conserv. Exp. Stn., Univ. Mont., Missoula.

Morphology described. The subspecific status of wolves in northeastern Minnesota is reviewed and a possible source of genes for this population is discussed.

KEY WORDS: taxonomy, general, Minnesota

Van Ballenberghe, V. 1981. Population dynamics of wolves in the Nelchina Basin, southcentral Alaska. Pages 1246-1258 in J.A. Chapman and D. Pursley, eds. Proc. Worldwide Furbearer Conf., August 3-11, 1980, Frostburg, MD.

Traces wolf numbers in Nelchina Basin from 1948. Human-caused mortality has historically determined wolf numbers.

KEY WORDS: population ecology, management, Alaska, history

- Van Ballenberghe, V. 1983. Extraterritorial movements and dispersal of wolves in southcentral Alaska. *J. Mammal.* 64(1):168-171.

Dispersal followed one or more preliminary extraterritorial trips and subsequent reintegration into pack. Dispersing wolves ultimately settled in areas used by alien pack. Documented acceptance of nonrelated wolves into packs.

KEY WORDS: dispersal, territory, Alaska

- Van Ballenberghe, V. 1983. Two litters raised in one year by a wolf pack. *J. Mammal.* 64(1):171-172.

Adults divided time between the 2 dens. Litters were combined in mid-July. High survival. Hypothesize that this is rare---must have large territory, prey base near both dens.

KEY WORDS: Alaska, population regulation, population ecology, behavior, denning, breeding strategy

- Van Ballenberghe, V. 1984. Injuries to wolves sustained during live-capture. *J. Wildl. Manage.* 48(4):1425-1429.

Less than 2% of 126 wolves captured died, but a higher percentage had serious injuries. Recommend short chains and possible use of tranquilizer tabs on traps.

KEY WORDS: capture, injuries and accidents

- Van Ballenberghe, V. 1985. Wolf predation on caribou: the Nelchina herd case history. *J. Wildl. Mgmt.* 49(3):711-720.

Herd decline unlikely to have been caused by wolf predation. Poor survival of calves due to severe winters and high adult mortality due to hunting contributed greatly to decline.

KEY WORDS: predation, prey biomass, prey response, Rangifer tarandus, Alaska

- Van Ballenberghe, V. and J. Dart. 1982. Harvest yields from moose populations subject to wolf and bear predation. *Alces* 18:258-275.

A simple conceptual model is presented that links several important variables based on ratio of moose/predator at equilibrium. This ratio is based on annual predator kill rates, potential rate of increase in moose, and hunting mortality. Shows bull-hunting-only is less likely to lead to population collapse.

KEY WORDS: prey biomass, Alaska, modeling, Alces alces, Ursus arctos, competition, consumption, Ursus americanus

- Van Ballenberghe, V. and A.W. Erickson. 1973. A wolf pack kills another wolf. *Am. Midl. Nat.* 90(2):490-493.

Evidence that a pack of 3-5 wolves killed and consumed a conspecific is presented. Reports on intraspecific intolerance among wolves are reviewed.

KEY WORDS: agonistic behavior, behavior

- Van Ballenberghe, V., A.W. Erickson, and D. Byman. 1975. Ecology of the timber wolf in northeastern Minnesota. *Wildl. Monogr.* 43. 44pp.

Summer food habits analyzed through scats. Primarily white-tailed deer, then moose, then beaver, then miscellaneous. White-tailed deer utilized heavily even though its population decreased and moose population was high, 10.4-17.6 sq km/wolf.

KEY WORDS: Minnesota, predation, Odocoileus virginianus, Alces alces, Castor canadensis, scat analysis, small prey, territory, population ecology, management, rendezvous site

- Van Ballenberghe, V. and L.D. Mech. 1975. Weights, growth, and survival of timber wolf pups in Minnesota. *J. Mammal.* 56(1):44-63.

Growth of 0.05 to 0.23 kg/day. Weights between litters, years, and littermates varied greatly. Pups weighing below 60% of standard (captive) had poor survival. Summer food supply important to pup survival even if there is surplus in winter.

KEY WORDS: Minnesota, capture, population regulation, physiology

- Van Camp, J. and R. Gluckie. 1979. A record long-distance move by a wolf (Canis lupus). *J. Mammal.* 60(1):236.

Canada. Young mature male left pack and travelled 670 km (straight line) until killed by car.

KEY WORDS: Canada, dispersal

- Voigt, D.R., G.B. Kolenosky, and D.H. Pimlott. 1976. Changes in summer foods of wolves in central Ontario. *J. Wildl. Manage.* 40(4):663-668.

Compared food habits from early 1960's to mid 1970's. Increased use of beaver, decreased white-tailed deer. Decline of deer noted in these years. No change in beaver. Moose taken infrequently. Juvenile deer and moose taken more than adults.

KEY WORDS: Canada, Ontario, Odocoileus virginianus, Castor canadensis, prey selection, predation, Alces alces

Voskar, J. 1983. Present problems of wolf preservation in Czechoslovakia. Acta Zool. Fenn. 174:287-288.

About 18 packs of 7 individuals each in 1982. Rest of population is solitary or in smaller groups. Working on development of a livestock reimbursement program.

KEY WORDS: management, Europe, human attitudes

Wabakken, P., O.J. Sorensen, and T. Kvam. 1983. Wolves (Canis lupus) in southeastern Norway. Acta Zool. Fenn. 174:277.

Found 6-12 individuals in Norway. Sweden and Norway cooperating in monitoring study.

KEY WORDS: management, Europe

Wade, D.A., and J.E. Browns. 1982. Procedures for evaluating predation on livestock and wildlife. Texas A&M Univ. Sys. and U.S. Fish and Wildl. Serv. 42pp.

Step-by-step procedure on discriminating between a predator-killed animal and an animal dying from other causes. Describes kill characteristics of coyotes, dogs, foxes, cats, black bear, birds, rattlesnakes. Color photos.

KEY WORDS: kill analysis, depredation, predation

Walters, C.J., M. Stocker, and G.C. Haber. 1981. Simulation and optimization models for a wolf-ungulate system. Pages 317-337 in C.W. Fowler and T.D. Smith, eds. Dynamics of large mammal populations. John Wiley and Sons, Inc., NY.

Reviews simulation model of wolf-ungulate dynamics developed by Haber et al. (1976) and presents optimal moose harvesting and wolf control policies using dynamic programming. Takes into account past harvesting and environmental variation and specifies next harvest.

KEY WORDS: predation, modeling, population ecology

Weaver, J. 1978. The wolves of Yellowstone. U.S. Dept. Inter., Natl. Park Serv. Nat. Resour. Rep. 14. 39pp.

Traces history of wolves in Yellowstone. Food habits, ecology. Hypothesizes about recent sightings. Suggests relocating wolves into Yellowstone.

KEY WORDS: history, distribution, management, Yellowstone, predation, denning, rendezvous site, relocation

Weaver, J. 1983. Of wolves and livestock. *West. Wildlands* 8(4):37-39.

Overview of depredation statistics from various part of North America. Suggestions for resolving problems.

KEY WORDS: Yellowstone, Montana, Idaho, Wyoming, cattle, depredation, general interest

Weaver, J. 1986. Of wolves and grizzly bears. *West. Wildlands* 12(3):27-29.

Discusses possible results of wolf-bear interaction (especially Yellowstone). Likely that bears will have more access to carrion due to displacement of wolves at kills and scavenging old kills.

KEY WORDS: Ursus arctos, competition, nonprey interactions, general interest, Yellowstone

Weaver, J.L. 1979. Differential detectability of rodents in coyote scats. *J. Wildl. Manage.* 43(3):783-786.

Inferences about the relative importance of different prey in predator diets may not be valid unless differences in detectability (related to biomass of prey) are considered and data adjusted appropriately.

KEY WORDS: scat analysis, small prey, predation

Weaver, J.L. 1979. Population history, ecology, and status of wolves in northwestern Wyoming. *Portland Wolf Symp.*, Aug. 13-17, 1979. 22pp.

Wolves probably occurred in low densities during latter 1800's. Populations in Yellowstone National Park may have reached nonequilibrium of 30-40 animals in 1912. Extensive control effectively eliminated wolves after that. Elk principal food. Current reports probably represent singles and pairs.

KEY WORDS: population ecology, history, relocation, Yellowstone, predation, Cervus elaphus

Weaver, J.L. 1979. Wolf predation upon elk in the Rocky Mountain parks of North America: a review. Pages 29-33 in M.S. Boyce and L.D. Hayden-Wing, eds. *North American elk: ecology, behavior, and management*. Univ. Wyo., Laramie.

Several studies show elk to be principal prey of wolves in Rocky Mountains in winter. Consumed 5.2-7.5 kg elk/wolf/day. Usually 5 or more wolves. Chases short. Elk escape in water, by flight, by using forelimbs.

KEY WORDS: predation, Cervus elaphus, Canada, prey selection, Odocoileus hemionus, hunting techniques, prey response, consumption

Weaver, J.L. and S.H. Fritts. 1979. Comparison of coyote and wolf scat diameters. J. Wildl. Manage. 43(3):786-788.

Considerable overlap of 2 species. Determined that air-dried scats of 30 mm and larger diameter are wolf with 95% confidence. However, 2/3 of wolf scats are smaller so considerable information is lost.

KEY WORDS: scat analysis

Weise, T.F., W.L. Robinson, R.A. Hook, and L.D. Mech. 1975. An experimental translocation of the eastern timber wolf. Audubon Conserv. Rep. 5. 28pp.

Released 4 wild captured wolves in Michigan. Lone female stayed in area. Others settled about 55 miles away. All eventually died of human causes within 9 mos. Strong public education program, removal of coyote bounty, and release of more wolves is recommended for future reintroductions.

KEY WORDS: human attitudes, relocation, Michigan

Weise, T.F., W.L. Robinson, R.A. Hook, and L.D. Mech. 1979. An experimental translocation of the eastern timber wolf. Pages 346-419 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Released 4 wild captured wolves in Michigan. All killed by humans within 9 months. Increased daily movements for 2 months after release.

KEY WORDS: human attitudes, relocation, Michigan

White, M.J.D. 1973. Descriptions of remains of deer fawns killed by coyotes. J. Mammal. 54(1):291-293.

Most fawns have bite marks on head or neck. In heavily utilized kills, usually upper tooth row and lower jaw remain. Utilization depends on fawn abundance.

KEY WORDS: kill analysis, Odocoileus virginianus, predation

Wolfe, M.L. and D.L. Allen. 1973. Continued studies of the status, socialization, and relationships of Isle Royale wolves, 1967-1970. J. Mammal. 54(3):611-635.

Numbers, pack structures, and observed relationships reported. Common pack size 6 or 7. In 2 years considered to be environmentally favorable, there were unexpectedly small population gains.

KEY WORDS: population ecology, behavior, social system, predation, Isle Royale

Woolpy, J.H. and I. Eckstrand. 1979. Wolf pack genetics, a computer simulation with theory. Pages 206-224 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Processes of pack formation, mate selection, and genetic combination are simulated as they might occur in nature. Conclusion is that average locus would probably be fixed within 20 years in any given pack.

KEY WORDS: genetics, modeling

Young, S.P. and E.A. Goldman. 1944. Wolves of North America. Dover Publ. Inc., NY. 636pp.

Originally written 1944. Updated. Accounts of wolf attacks, history of bounty system, systematics, capturing methods, food habits recorded. History of wolf exploitation in the United States detailed.

KEY WORDS: taxonomy, general, distribution, behavior, human interaction, predation, management, capture, depredation

Zarnoch, S.J. and B.J. Turner. 1974. A computer simulation model for the study of wolf-moose population dynamics. J. Environ. Sys. 4(1):39-51.

Simulation model of a wolf-moose system. Especially for use as a teaching aid. Parameters such as mortality rate, vegetation supply, etc. can be altered.

KEY WORDS: modeling, Alces alces, population ecology

Zimen, E. 1975. Social dynamics of the wolf pack. Pages 336-362 in M.W. Fox, ed. The wild canids. Van Nostrand Reinhold Co., NY.

Describes social dynamics and rank order. "Scapegoats" are wolves who have fought for dominance and lost. Their resulting status in the pack is dependent on their former relations with the pack members. If they were previously "nice" to subordinates they may remain in pack; otherwise they may be driven off and become lone or "trailing" wolves.

KEY WORDS: social system, single wolves, breeding strategy, agonistic behavior, behavior

Zimen, E. 1976. On the regulation of pack size in wolves. Zeit. fur Tierpsych. 40(3):300-341.

Size of packs correlates to density of wolf population, size of main prey species, and density of prey species. Optimal for moose 8-12, for deer 6-10.

KEY WORDS: modeling, population ecology, social system, dispersal, population regulation

Zimen, E. 1981. Italian wolves. Nat. Hist. 90(2):66-81.

Discusses status of wolves in Italy. Utilized telemetry. Red deer released in area to hopefully reduce wolves' dependence on refuse dumps and livestock. Local attitudes discussed.

KEY WORDS: Europe, behavior, territory, human interaction, human attitudes, depredation, sheep, distribution, management, general interest

Zimen, E. 1981. The wolf, a species in danger. Delacorte Press, NY. 373pp.

Behavior, ecology, and relationship with man.

KEY WORDS: general, general interest

Zimen, E. 1982. A wolf pack sociogram. Pages 282-322 in F.H. Harrington, and P.C. Paquet, eds. Wolves of the world. Noyes Publ., Park Ridge, NJ.

Agonistic behavior encounters observed between all pack members. High-intensity aggression occurs between females primarily. Territorial behavior most intense in high-ranking adults.

KEY WORDS: single wolves, dispersal, behavior, breeding strategy, agonistic behavior, social system

Zimen, E. and L. Boitani. 1979. Status of the wolf in Europe and the possibilities of conservation and reintroduction. Pages 43-83 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, NY.

Reestablishment and continued existence of wolves depends on human attitudes. Wolves currently exist in eastern Europe and all southern European countries.

KEY WORDS: Europe, relocation, range expansion, human interaction, human attitudes, distribution

APPENDIX I. SUBJECT LISTING - AUTHOR AND TITLE

I.1. BEHAVIOR

- Asa, C.S., L.D. Mech, and U.S. Seal. 1985. The use of urine, feces, and anal-gland secretions in scent-marking by a captive pack.
- Bekoff, M. 1974. Social play in coyotes, wolves, and dogs.
- Bjarvall, A. and E. Isakson. 1982. Winter ecology of a pack of three wolves in northern Sweden.
- Bulger, A.J. 1975. The evolution of altruistic behavior in social carnivores.
- Cheney, C.D. 1982. Probability learning in captive wolves.
- Dekker, D. 1985. Responses of wolves, Canis lupus, to simulated howling on a homesite during fall and winter in Jasper National Park, Alberta.
- Fentress, J.C. and J. Ryon. 1982. A long-term study of distributed pup feeding in captive wolves.
- Field, R. 1979. A perspective on syntactics of wolf vocalizations.
- Fox, M.W. 1971. Possible examples of high-order behavior in wolves.
- Fox, M.W. and R.V. Andrews. 1972. Physiological and biochemical correlates of individual differences in behavior of wolf cubs.
- Harrington, F.H. 1975. Response parameters of elicited wolf howling.
- Harrington, F.H. and L.D. Mech. 1978. Howling at two Minnesota wolf pack summer homesites.
- Harrington, F.H. and L.D. Mech. 1982. Patterns of homesite attendance in two Minnesota wolf packs.
- Harrington, F.H., P.C. Paquet, J. Ryon, and J.C. Fentress. 1982. Monogamy in wolves: a review of the evidence.
- Klinghammer, E. 1979. The behavior and ecology of wolves.
- Klinghammer, E. and L. Laidlow. 1975. Analysis of 23 months of daily howl records in a captive grey wolf pack Canis lupus.
- Knick, S.T. and L.D. Mech. 1980. Sleeping distance in wild wolf packs.
- Kolczak, L. 1986. To track a wolf.
- Lockwood, R. 1979. Dominance in wolves: useful construct or bad habit?

- Lyons, C.A., P.M. Ghezzi, and C.D. Cheney. 1982. Reinforcement of cooperative behavior in captive wolves.
- Mahrenke, P., III. 1971. Observation of four wolves killing another wolf.
- Mech, L.D. and S.T. Knick. 1978. Sleeping distance in wolf pairs in relation to the breeding season.
- Moran, G. and J.C. Fentress. 1979. A search for order in wolf social behavior.
- Paquet, P.C., S. Bragdon, and S. McCuster. 1982. Cooperative rearing of simultaneous litters in captive wolves.
- Paquet, P.C. and L.N. Carbyn. 1986. Wolves, Canis lupus, killing denning black bears, Ursus americanus, in the Riding Mountain National Park area.
- Peters, R.P. and L.D. Mech. 1975. Scent-marking in wolves.
- Peterson, R.O. 1979. Social rejection following mating of a subordinate wolf.
- Ramsay, M.A. and I. Stirling. 1984. Interactions of wolves and polar bears in northern Manitoba.
- Rothman, R.J. and L.D. Mech. 1979. Scent-marking in lone wolves and newly formed pairs.
- Ryon, C.J. 1977. Den digging and related behavior in a captive timber wolf pack.
- Scott, B. and D.M. Shackleton. 1982. A preliminary study of the social organization of the Vancouver Island wolf.
- Sharp, H.S. 1982. Some problems in wolf sociology.
- Stephenson, R.O. 1974. Characteristics of wolf den sites.
- Sullivan, J.O. 1979. Individual variability in hunting behavior of wolves.
- Theberge, J.B. and J.B. Falls. 1967. Howling as a means of communication in timber wolves.
- Theberge, J.B. and D.H. Pimlott. 1969. Observations of wolves at a rendezvous site in Algonquin Park.
- Van Ballenberghe, V. and A.W. Erickson. 1973. A wolf pack kills another wolf.
- Wolfe, M.L. and D.L. Allen. 1973. Continued studies of the status, socialization, and relationships of Isle Royale wolves, 1967-1970.
- Zimen, E. 1975. Social dynamics of the wolf pack.
- Zimen, E. 1982. A wolf pack sociogram.

I.2. DISPERSAL MOVEMENTS TERRITORY

- Ballard, W.B. and J.R. Dau. 1983. Characteristics of gray wolf, Canis lupus, den and rendezvous sites in southcentral Alaska.
- Ballard, W.B., R. Farnell, and R.O. Stephenson. 1983. Long distance movement by gray wolves, Canis lupus.
- Bekoff, M. 1977. Mammalian dispersal and the ontogeny of individual behavioral phenotypes.
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APPENDIX II. KEY WORD GLOSSARY

ACTIVITY PATTERNS

daily activity patterns, sleep-wake cycle, daily movements

AGONISTIC BEHAVIOR

occurrences of, circumstances surrounding, results of agonistic behavior

ALASKA

ALBERTA

ALCES ALCES moose-wolf interaction

ASIA

BEHAVIOR describes and/or notes wolf behavior

BISON BISON bison-wolf interaction

BREEDING STRATEGY

behavior during courtship, conditions favoring one or multiple breeding within pack, breeding inhibitions

BRITISH COLUMBIA

CANADA

CANIS LATRANS wolf-coyote interactions, identifying between

CAPTURE methods of trapping and killing, drugging methods, injuries associated with

CASTOR CANADENSIS

beaver-wolf interaction

CATTLE domestic cattle-wolf interactions

CENSUSING techniques and methods of

CERVUS ELAPHUS elk and red deer-wolf interactions

COMMUNICATION scent marking and howling

COMPETITION primarily interspecies

CONSUMPTION food intake per wolf per day

CORVUS CORAX raven-wolf interaction

DENNING	behavior, "helpers," pup care, den site location and characteristics
DEPREDATION	predation on domestic animals (some studies do not involve wolves--abstract or title specifies this)
DISPERSAL	distance of, as relates to sex, age, prey base, wolf density
DISTRIBUTION	geographic and in relation to prey base, topography, habitat
DOG	dog-wolf interactions, identifying between
ENDANGERED SPECIES ACT AND LEGISLATION	wolves in relation to the Endangered Species Act, recovery plans, legislation involving wolves
EUROPE	European and Middle Eastern countries
GENERAL	deals with many or all key words, sometimes major subjects are also noted by specific key words but "general" in the key word list means that not everything contained is key-worded
GENERAL INTEREST	nontechnical articles
GENETICS	minimum population sizes, gene flow, hybridization
HAIR ANALYSIS	prey identification by, techniques of, distinguishing wolves from other canids with
HARVESTING	rates of harvest, commercial value
HISTORY	historical distribution, attitudes, and scientific knowledge of (pre-1950 primarily)
HUMAN ATTITUDES	cultural perceptions of the wolf, surveys of attitudes toward, effects attitudes have on wolf management
HUMAN INTERACTION	human-wolf interactions, aggressive encounters with, effects human disturbance has on behavior, denning, and movements
HUNTING TECHNIQUES	techniques used by wolves in searching for and killing prey
IDAHO	
INJURIES AND ACCIDENTS	results of, causes of, types of, frequency of, includes capture related
IOWA	

ISLE ROYALE

KILL ANALYSIS determining mortality agents, techniques for analyzing prey condition, age, sex

LYNX CANADENSIS lynx-wolf interaction

MANAGEMENT control programs and effects, reasons for, management of small isolated populations, harvest rates

MANITOBA

MICHIGAN

MINNESOTA

MODELING predator-prey models, behavioral models, population models, prey habitat models

MONTANA

NEW YORK

NONPREY INTERACTIONS interactions between wolves and species not generally considered to be prey

NORTHWEST TERRITORIES

ODOCOILEUS HEMIONUS mule and black-tailed deer-wolf interaction

ODOCOILEUS VIRGINIANUS white-tailed deer-wolf interaction

ONTARIO

OREAMNOS AMERICANUS mountain goat-wolf interaction

OTHER DOMESTIC ANIMALS wolf interaction with domestic animals (not including cattle, sheep, dog, and reindeer)

OVIPOS MOSCHATUS musk ox-wolf interaction

OVIS CANADENSIS bighorn sheep-wolf interaction

OVIS DALLI Dall sheep-wolf interaction

PARASITES AND DISEASE	effects of, types of, frequency of
PHYSIOLOGY	health parameters, sex ratio, aging, sexing, blood chemistries
POPULATION ECOLOGY	mortality, recruitment, natality, numbers per prey
POPULATION REGULATION	regulation of wolf numbers by food base, disease, and behavior
PREDATION	wolf-prey interaction
PREY BIOMASS	prey biomass necessary to prevent prey population collapse
PREY RESPONSE	behavioral, numerical, and distributional responses of prey to wolf predation
PREY SELECTION	selection of prey by species, sex, age, condition, habitat, environmental conditions
QUEBEC	
RANGE EXPANSION	ecosystem adjustments to wolf establishment in formerly unoccupied range
<u>RANGIFER TARANDUS</u>	caribou-wolf interaction
REINDEER	domestic reindeer-wolf interaction
RELOCATION	responses of wolves to relocation, theories on best methods of, potential areas for
RENDEZVOUS SITE	behavior at, characteristics of, function of
SASKATCHEWAN	
SCAT ANALYSIS	techniques of, results of, distinguishing between wolf scat and other predators, identifying contents of
SHEEP	domestic sheep-wolf interaction
SINGLE WOLVES	behavior of, studies of, and theories about lone and trailing wolves
SMALL PREY	all prey species smaller than <u>Castor canadensis</u>
SOCIAL SYSTEM	dominance and submissive behavior, pack construction, interaction

SOUTH DAKOTA

SURPLUS KILLING

theories about and incidences of surplus and excess killing by wolves and other predators

TAXONOMY

wolf subspecies description

TERRITORY

home range and territory formation and size, defense of

TRACKING

methods of, studies heavily utilizing this method, distinguishing wolf tracks from other species

UNION OF SOVIET SOCIALIST REPUBLICS

URSUS AMERICANUS

black bear-wolf interaction

URSUS ARCTOS

grizzly and brown bear-wolf interaction

URSUS MARITIMUS

polar bear-wolf interaction

WASHINGTON

WISCONSIN

WYOMING

YELLOWSTONE

Yellowstone National Park and surrounding wilderness

YUKON

Yukon (province)

INDEX

- Alces alces 3, 6, 8, 9, 12, 13, 15, 16, 18, 21, 23, 25, 26, 27, 33, 42, 48, 49, 57, 58, 62, 64, 69, 70, 71, 72, 75, 79, 80, 84, 109
Bison bison 16, 54, 109
Canis latrans 7, 11, 14, 15, 24, 37, 38, 109
Castor canadensis 14, 16, 23, 24, 48, 57, 67, 69, 71, 75, 76, 80, 109
Cervus elaphus 13, 14, 15, 16, 18, 26, 33, 53, 64, 67, 82, 109
Corvus corax 28, 109
Lynx canadensis 8, 53, 111
Odocoileus hemionus 4, 13, 18, 24, 25, 33, 36, 48, 64, 67, 82, 111
Odocoileus virginianus 3, 15, 16, 31, 34, 38, 39, 41, 42, 43, 44, 46, 47, 49, 51, 52, 59, 64, 65, 71, 75, 76, 80, 83, 111
Oreamnos americanus 21, 111
Ovibos moschatus 25, 111
Ovis canadensis 13, 18, 111
Ovis dalli 27, 32, 33, 51, 62, 67, 72, 111
Rangifer tarandus 6, 8, 13, 19, 25, 27, 33, 34, 39, 49, 50, 62, 70, 71, 72, 79, 112
Ursus americanus 55, 65, 79, 113
Ursus arctos 5, 6, 58, 79, 82, 113
Ursus maritimus 61, 113
- Activity patterns 6, 11, 12, 15, 21, 23, 29, 38, 42, 44, 47, 54, 56, 67, 72, 75, 79, 109
 Agonistic behavior 7, 8, 14, 19, 29, 36, 40, 44, 54, 55, 58, 80, 84, 85, 109
 Alaska 4, 5, 6, 8, 12, 16, 17, 21, 24, 25, 27, 28, 32, 33, 34, 36, 40, 48, 51, 53, 56, 58, 59, 61, 62, 63, 65, 70, 71, 72, 78, 79, 109
 Alberta 7, 10, 11, 13, 16, 18, 19, 23, 24, 25, 26, 30, 54, 64, 77, 109
 Asia 69, 109
- Behavior 7, 8, 12, 17, 19, 20, 21, 28, 29, 30, 38, 40, 43, 47, 48, 50, 51, 54, 55, 57, 58, 60, 66, 69, 73, 75, 76, 79, 80, 83, 84, 85, 109
 Breeding strategy 6, 30, 47, 54, 55, 58, 66, 79, 84, 85, 109
 British Columbia 4, 18, 21, 33, 36, 64, 67, 77, 109
- Canada 4, 7, 8, 9, 10, 13, 14, 15, 16, 18, 21, 23, 24, 25, 26, 31, 33, 36, 38, 39, 48, 49, 50, 51, 54, 59, 64, 67, 68, 70, 73, 74, 75, 77, 80, 82, 109
 Capture 5, 6, 18, 23, 25, 39, 45, 69, 72, 76, 77, 78, 79, 80, 84, 109
 Cattle 10, 11, 15, 19, 22, 23, 25, 26, 66, 77, 82, 109
 Censusing 4, 8, 13, 18, 23, 24, 25, 29, 33, 34, 43, 45, 50, 56, 66, 70, 75, 76, 109
 Communication 4, 11, 14, 18, 20, 28, 29, 39, 56, 57, 63, 66, 73, 74, 75, 76, 109

- Competition 5, 6, 11, 15, 24, 47, 58, 65, 79, 82, 109
 Consumption 5, 6, 15, 18, 20, 22, 27, 33, 34, 38, 42, 43, 44, 46, 49, 54, 57, 59, 70, 75, 79, 82, 109

 Denning 5, 6, 13, 16, 17, 19, 29, 36, 55, 57, 62, 66, 71, 72, 74, 78, 79, 81, 110
 Depredation 5, 9, 10, 11, 12, 14, 15, 17, 18, 19, 22, 23, 25, 26, 27, 30, 31, 32, 34, 39, 41, 44, 47, 53, 60, 63, 64, 65, 66, 67, 76, 77, 81, 82, 84, 85, 110
 Dispersal 5, 6, 8, 9, 11, 22, 23, 32, 44, 46, 48, 49, 54, 55, 59, 60, 79, 80, 84, 85, 110
 Distribution 3, 5, 7, 9, 12, 15, 18, 28, 30, 32, 33, 35, 36, 37, 41, 46, 47, 53, 60, 63, 64, 65, 69, 75, 81, 84, 85, 110
 Dog 4, 7, 11, 19, 21, 47, 110

 Endangered Species Act and legislation 3, 12, 18, 19, 22, 27, 28, 35, 36, 40, 43, 50, 56, 63, 64, 73, 75, 76, 77, 78, 110
 Europe 9, 10, 11, 36, 47, 48, 53, 60, 61, 70, 81, 85, 110

 General 3, 6, 9, 12, 16, 18, 20, 22, 25, 27, 30, 38, 40, 42, 43, 45, 51, 53, 56, 57, 59, 60, 64, 66, 71, 74, 78, 84, 85, 110
 General interest 3, 4, 5, 9, 12, 14, 17, 19, 20, 26, 27, 38, 40, 41, 43, 44, 45, 51, 53, 57, 60, 61, 63, 65, 66, 67, 74, 82, 85, 110
 Genetics 4, 9, 11, 12, 21, 22, 27, 47, 69, 74, 84, 110

 Hair analysis 16, 37, 51, 110
 Harvesting 37, 58, 59, 61, 110
 History 3, 5, 7, 12, 15, 18, 25, 26, 28, 30, 31, 33, 36, 37, 39, 40, 43, 50, 51, 60, 62, 63, 64, 65, 69, 70, 74, 75, 77, 78, 81, 82, 110
 Human attitudes 3, 5, 7, 9, 10, 11, 13, 14, 15, 18, 20, 22, 32, 34, 35, 37, 40, 41, 44, 47, 48, 51, 53, 57, 60, 61, 62, 63, 65, 66, 67, 71, 72, 73, 74, 78, 81, 83, 85, 110
 Human interaction 5, 9, 11, 12, 13, 14, 16, 17, 18, 19, 23, 25, 27, 28, 29, 30, 34, 35, 36, 40, 44, 46, 47, 49, 51, 57, 58, 59, 60, 68, 69, 71, 72, 73, 75, 77, 84, 85, 110
 Hunting techniques 3, 9, 12, 13, 16, 21, 24, 25, 28, 39, 41, 43, 47, 52, 53, 56, 57, 67, 70, 72, 73, 82, 110

 Idaho 3, 18, 28, 33, 36, 37, 64, 78, 82, 110
 Injuries and accidents 39, 52, 67, 77, 79, 110
 Iowa 67
 Isle Royale 3, 36, 42, 57, 58, 69, 71, 83, 111

 Kill analysis 12, 31, 45, 50, 51, 53, 61, 66, 68, 76, 81, 83, 111

Management 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22,
23, 25, 26, 27, 28, 31, 32, 34, 36, 37, 39, 41, 44, 45, 47
48, 50, 53, 54, 55, 58, 59, 61, 62, 69, 70, 72, 73, 74, 75,
76, 77, 78, 80, 81, 84, 85, 111
Manitoba 13, 14, 15, 16, 36, 70, 111
Michigan 32, 34, 35, 36, 83, 111
Minnesota 3, 8, 19, 22, 23, 24, 27, 28, 29, 30, 34, 37, 38, 41, 42, 43,
44, 45, 46, 47, 50, 51, 52, 53, 65, 68, 71, 77, 78, 80, 111
Modeling 9, 27, 37, 46, 49, 54, 55, 58, 73, 74, 79, 81, 84, 111
Montana 3, 12, 18, 33, 40, 41, 63, 64, 65, 69, 78, 82, 111

New York 32, 111

Nonprey interactions 3, 5, 6, 11, 14, 15, 24, 28, 47, 51, 55, 58, 61,
65, 82, 111

Northwest Territories 25, 31, 39, 50, 111

Ontario 8, 21, 35, 36, 38, 39, 59, 73, 75, 80, 111

Other domestic animals 77, 111

Parasites and disease 5, 14, 15, 25, 46, 61, 77, 112

Physiology 19, 21, 24, 25, 26, 30, 33, 36, 43, 44, 47, 49, 54, 55, 62,
63, 68, 71, 72, 80, 112

Population ecology 3, 6, 7, 8, 9, 11, 12, 13, 14, 15, 18, 23, 24, 25,
27, 30, 31, 36, 37, 39, 43, 44, 45, 46, 47, 48, 52, 54, 55,
57, 58, 59, 61, 62, 69, 70, 71, 72, 73, 75, 77, 78, 79, 80,
81, 82, 83, 84, 112

Population regulation 13, 14, 15, 23, 25, 30, 37, 42, 43, 44, 48, 49,
54, 55, 57, 58, 59, 68, 71, 75, 77, 78, 79, 80, 84, 112

Predation 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21,
22, 24, 25, 26, 27, 31, 32, 33, 34, 36, 37, 38, 39, 41, 42,
43, 44, 45, 46, 47, 48, 49, 50, 52, 53, 54, 57, 58, 59, 60,
62, 64, 65, 67, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81,
82, 83, 84, 112

Prey biomass 8, 23, 25, 26, 27, 32, 36, 37, 46, 49, 54, 57, 59, 70, 79
112

Prey response 4, 6, 8, 9, 13, 15, 16, 18, 21, 25, 26, 27, 34, 37, 41,
42, 44, 46, 48, 49, 50, 51, 52, 53, 57, 58, 59, 65, 70, 71,
73, 74, 79, 82, 112

Prey selection 3, 6, 9, 10, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26,
27, 33, 34, 38, 39, 46, 49, 50, 52, 53, 54, 57, 59, 67, 72,
73, 74, 75, 76, 80, 82, 112

Quebec 4, 7, 18, 112

Range expansion 3, 11, 15, 24, 25, 32, 48, 59, 60, 62, 63, 67, 76, 85,
112

Reindeer 9, 112

Relocation 7, 19, 22, 23, 25, 32, 35, 41, 44, 48, 56, 58, 59, 61, 63,
69, 72, 73, 75, 77, 81, 82, 83, 85, 112
Rendezvous site 5, 13, 16, 17, 18, 28, 29, 57, 67, 68, 71, 75, 78, 80,
81, 112

Saskatchewan 18, 112

Scat analysis 13, 16, 20, 21, 24, 34, 35, 49, 62, 64, 67, 71, 74, 75,
76, 80, 82, 83, 112

Sheep 12, 17, 22, 23, 27, 41, 65, 66, 67, 76, 77, 85, 112

Single wolves 9, 10, 11, 15, 16, 28, 29, 36, 49, 64, 66, 69, 84, 85, 112

Small prey 8, 16, 24, 33, 39, 62, 71, 72, 74, 76, 80, 82, 112

Social system 12, 19, 21, 27, 28, 29, 30, 36, 38, 40, 51, 54, 55, 69,
83, 84, 85, 112

South Dakota 18, 113

Surplus killing 9, 15, 19, 39, 46, 50, 57, 58, 113

Taxonomy 21, 26, 43, 53, 56, 78, 84, 113

Territory 6, 8, 9, 12, 13, 14, 15, 18, 22, 24, 28, 29, 34, 38, 39, 43,
44, 46, 48, 49, 54, 55, 56, 57, 59, 62, 63, 64, 65, 66, 67,
71, 72, 76, 78, 79, 80, 85, 113

Tracking 10, 21, 31, 56, 57, 76, 113

Union of Soviet Socialist Republics 9, 20, 60, 61, 113

Washington 28, 73, 113

Wisconsin 36, 47, 75, 76, 113

Wyoming 18, 33, 64, 82, 113

Yellowstone 7, 20, 41, 61, 78, 81, 82, 113

Yukon 4, 33, 70, 113



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